

By Mike Buchanan at 2:25 pm, Jun 06, 2024



## 2022 Annual Report

Vacuum Glorietta East Unit (1RP-744)  
Lea County, New Mexico



#212C-HN-02008  
January 27, 2023



Review of the Vacuum Glorietta East Unit, 2022 Annual Report: Content Satisfactory

1. Continue to operate SVE system and conduct O&M routinely as system is functioning appropriately and is effective.
2. Complete evaluation for PSH and its presence in VG-4
3. Continue to conduct semi-annual groundwater monitoring events and submit them to OCD.
4. Submit the 2023 Annual Report if it hasn't already been uploaded to the online portal.
5. Submit the 2024 Annual Report to OCD by April 1, 2025.

# 2022 Annual Report

Vacuum Glorietta East Unit (1RP-744)  
Lea County, New Mexico

#212C-HN-02008  
January 27, 2023

## PRESENTED TO

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## 1.0 INTRODUCTION

On behalf of This report details the continuing groundwater monitoring and remedial activities at the Maverick Natural Resources, LLC (Maverick) Vacuum Glorietta East Unit Site in Lea County, New Mexico (Site). The Site is located on Buckeye Road approximately 17 miles west-northwest of Hobbs, New Mexico, and assigned New Mexico Oil Conservation Division (NMOCD) identifier 1RP-744. Groundwater monitoring and remediation at the Site are conducted under New Mexico Oil Conservation District (NMOCD) Administrative/Environmental Order AP-115-1. The Site and surrounding areas are rural grasslands used primarily for oil and gas production.

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## 2.0 BACKGROUND AND PREVIOUS INVESTIGATIONS

In October 2002 the Site operator reported a Release Notification to the NMOCD for which the current impacts to soil and groundwater at the Site are believed to be associated. Approximately 80 barrels (bbls) of oil and 20 bbls of water were recovered after the release with an affected area of approximately 12,000 square feet.

The initial investigation was performed at the Site by B&H Environmental Services in November 2002. The investigation included the installation of one groundwater monitor well which was subsequently destroyed during follow-on excavation works. The investigation indicated the presence of chlorides and petroleum hydrocarbons above NMOCD Recommended Remedial Action Limits (RRALs). Approximately 3,240 cubic yards (CY) of petroleum-impacted soil was excavated in August 2004, and another 1,000 CY of soil was removed in November and December 2008 after additional assessment.

Backfilling and reseeded of the excavation were completed in June 2009 along with the installation of three monitor wells, one in the excavation footprint, one upgradient of the excavation, and one downgradient of the excavation. Three additional groundwater monitor wells VG-5, VG-6, and VG-7 were installed in December 2013 to further assess the northern, western, and southern extent of hydrocarbon and chloride impacts in the groundwater.

Small quantities of phase-separated hydrocarbons (PSH) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) and chlorides at concentrations greater than New Mexico Water Quality Control Commission (NMWQCC) Groundwater Quality Standards have historically been reported in samples collected from monitoring well VG-4. Mobile dual-phase extraction (DPE) has been used as a remediation method at the Site previously at monitor well VG-4 in September 2014, May 2015, June 2019, May 2020, February 2021, and May 2021 by AcuVac Remediation, LLC (AcuVac) of Houston, Texas. Based on the absence of measurable PSH at the Site in 2021, 2022 remedial activities shifted to single-phase SVE events to target vapor-phase petroleum hydrocarbon recovery from soil and groundwater within the monitor well VG-4 zone of influence.

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## 3.0 HYDROGEOLOGY

### 3.1 GEOLOGY

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The Site is located in the Querecho Plains of southeastern New Mexico. This area generally consists of a thin cover of Quaternary sand dunes overlying the undivided Triassic Upper Chinle Group. The soil consists of well-drained sand and sandy clay loam. Typically, the surface layer is reddish-brown loamy fine sand. It is underlain by red light sandy clay. Below this is white moderately to well-indurated caliche. Underlying the caliche are dark reddish shales and thin sandstones of the undivided Triassic Upper Chinle Group. The Upper Chinle Group consists of silty shale, thin-bedded to massive, purplish red to reddish-brown with greenish reduction spots. The Upper Chinle Group is interbedded with thin beds of fine-grained sandstone with chert pebble gravel.

### 3.2 SITE HYDROGEOLOGY

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The water-bearing zone consists of the Pliocene-age Ogallala aquifer under unconfined conditions at the site. The Ogallala aquifer is located at the base of the Ogallala Formation. In general, the Ogallala Formation consists of quartz sand and gravel that is poorly to well-cemented with calcium carbonate and contains minor amounts of clay. The wells installed at the Site were drilled to depths of approximately 70 to 80 feet below ground surface (bgs) with static groundwater water levels at approximately 65 feet bgs.

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## 4.0 GROUNDWATER MONITORING

The Site is currently the subject of semi-annual groundwater monitoring under the NMOCD-approved abatement plan. The 2022 annual groundwater monitoring events were performed in May and November of 2022. The current groundwater monitoring and remediation program approved by the NMOCD includes semi-annual groundwater gauging and sampling of the Site monitoring well network comprised of monitoring wells VG-2, VG-3, VG-4, VG-5, VG-6, and VG-7 for analysis of BTEX and chloride. In addition to the groundwater monitoring program, remedial activities at the Site have included quarterly soil vapor extraction (SVE) events at monitor well VG-4.

### 4.1 GROUNDWATER LEVEL MEASUREMENTS

Prior to purging and sampling the monitor well network, Tetra Tech personnel gauged each well to measure the depth to groundwater and the presence of PSH, if any. Monitoring wells containing PSH are gauged, but not sampled. Groundwater level and PSH measurements are presented in **Table 1** along with groundwater elevation calculations. PSH was identified in V-4 during both 2022 groundwater monitoring events.

Groundwater elevations ranged from 3,863.55 feet above mean sea level (AMSL) in VG-5 to 3,864.51 feet AMSL in VG-6 in 2022. Groundwater potentiometric surface maps with calculated groundwater elevations are presented in **Figures 3** and **4**. Groundwater flow at the Site was shown to flow to the southeast with an approximate average hydraulic gradient of 0.00266 feet per foot in 2022, generally consistent with historical groundwater flow at the Site. Historical groundwater gauging data is provided in **Appendix C**.

### 4.2 GROUNDWATER SAMPLING

During the 2022 monitoring events, wells VG-3, VG-4, VG-5, VG-6, and VG-7 were sampled. VG-2 was not sampled as the monitoring well was dry during both 2022 groundwater monitoring events. Additionally, VG-4 was gauged but not sampled during the November groundwater monitoring event due to the presence of PSH in the well. Low-flow sampling methodology was utilized to purge and sample monitoring wells using a bladder pump with dedicated disposable tubing and bladders in accordance with United States Environmental Protection Agency (EPA) guidance. The bladder pump intake was set to the approximate center of the screened interval for each monitor well prior to purging. Bailers were used to sample wells VG-3 due to the low water level within the monitoring well.

Groundwater quality parameters including temperature, pH, Specific Conductivity (SC), Dissolved Oxygen (DO), Oxygen Reduction Potential (ORP), and turbidity were recorded during purging in addition to well drawdown and flow rate to document monitor well stabilization. Once field parameters stabilized at each well, samples were collected into laboratory-provided pre-preserved sample containers, immediately placed on ice, and transported to Pace Analytical Services, LLC, in Dallas, Texas, and Pace Analytical National in Mount Juliette, Tennessee, under chain-of-custody documentation submitted for analysis of the following constituents of concern (COCs):

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- 
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) by Method 8260; and
  - Chloride by Method 9056A.

### 4.3 GROUNDWATER ANALYTICAL RESULTS

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During the May 2022 sampling event, monitoring wells VG-3, VG-4, VG-5, VG-6, and VG-7 were sampled. VG-2 did not contain enough water to sample. The reported concentrations of benzene (1.56 mg/L) and chlorides (376 mg/L) in the sample collected from monitoring well VG-4 exceeded the applicable NMWQCC Groundwater Quality Standards of 0.01 mg/L and 250 mg/L, respectively. No additional exceedances of the applicable NMWQCC standards were identified during the May 2022 sampling event. Historical benzene groundwater concentration graphs are presented in **Appendix B**.

During the November 2022 monitoring event, monitoring wells VG-3, VG-5, VG-6, and VG-7, were sampled. No water was measured in VG-2 and 0.03 feet of PSH was measured in VG-4, therefore no samples were taken from these wells. No monitoring wells exceeded the applicable NMWQCC standards during the November 2022 sampling event.

**Table 2** presents a summary of the groundwater analytical results screened against NMWQCC Groundwater Quality Standards. The laboratory analytical data packages including chain-of-custody documentation are provided in **Appendix A**, benzene and chloride concentration maps are provided in **Figures 4** through **6**. Historical groundwater analytical data summaries are provided in **Appendix D**.

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## 5.0 QUALITY ASSURANCE/QUALITY CONTROL

A total of two primary groundwater samples from each well were collected and analyzed during each groundwater monitoring event in 2022, with the exception of VG-2 and VG-4. Samples were not collected in November from VG-2 as the well was dry and VG-4 due to the presence of PSH in the well. One field duplicate was collected and analyzed for each event.

### 5.1 FIELD AND LABORATORY PRECISION

The project measurement quality objectives are 30 percent for relative-percent-difference (RPD) between primary and duplicate sample results for inorganic analytes including chloride and 50 percent RPD between primary and duplicate sample results for organic analytes including BTEX. **Table 3** presents primary and duplicate sample results and RPD calculations. Out of the ten RPD calculations, ethylbenzene in the sample analyzed for monitoring well VG-4 from the May groundwater monitoring event reported an RPD of 122.6 percent, above the project DQO of 50 percent. All other primary-duplicate pair analytes for 2022 were within project DQOs.

### 5.2 LABORATORY DATA QUALIFICATION

No laboratory analytical results were qualified in the three analytical data packages during the three 2022 groundwater monitoring events.

### 5.3 DATA USABILITY

Groundwater analytical data are deemed useable for the purpose of determining groundwater COC concentrations at the Site. Field duplicate samples reported results within Data quality objectives with the exception of ethylbenzene in the samples collected from VG-4 in the May groundwater monitoring event, however, both the primary and duplicate samples reported concentrations as less than the NMWQCC Groundwater Quality Standards. Based on professional judgment and review of historical Site data, the integrity of analytical data was not significantly affected for samples.

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## 6.0 REMEDIAL ACTIVITIES

In 2022, PSH recovery was conducted at the Site during three soil vapor extraction (SVE) events. The events were conducted February 7 through 11, May 16 through 20, and November 7 through 11, 2022. During each event, Tetra Tech personnel mobilized to the Site to supervise remedial activities conducted by AcuVac. Each of the three events conducted during 2022 was performed at VG-4.

### 6.1 OBJECTIVES

The objectives of the SVE events are to induce a extract volatile vapor phase hydrocarbons from soils and groundwater at the VG-4 location which periodically exhibits measurable levels of PSH in the well or reports concentrations of benzene above NMWQCC Groundwater Quality Standards.

### 6.2 METHODOLOGY

The SVE system employed at the site consists of a vacuum pump driven by an internal combustion engine. The vacuum pump is connected to the extraction well and used to induce a vacuum on the well to volatilize light-end hydrocarbons in groundwater and surrounding vadose zone soil. Volatilized hydrocarbons flow through a moisture knockout tank to the vacuum pump and the internal combustion engine where they are burned as part of the normal combustion process. An auxiliary propane tank is fitted to the system as a supplementary fuel source to drive the engine during startup and when extracted well vapor cannot provide the required energy to drive the system.

Emissions from the engine pass through three catalytic converters to maximize the destruction of engine emissions. During SVE events the engine's fuel-to-air ratio is adjusted to maintain efficient combustion and minimize emissions. As the engine drives the entire system, the system stops when the engine stops preventing an uncontrolled release of hydrocarbons into the atmosphere. Since the System operates entirely under vacuum, any leaks in the system, leak the atmosphere into the System rather than allowing emission to the atmosphere.

Extracted Vapor phase hydrocarbon concentrations are measured after system startup and every 30 minutes during the daytime of SVE events while the SVE system is manned and under observation by AvuVac and Tetra Tech. Hydrocarbon vapor concentrations are analyzed with a modified Horiba Exhaust Gas Analyzer Photo Ionization Detector (PID) calibrated with hexane, carbon monoxide, and carbon dioxide. Vapor phase PSH volume recoveries reported by AcuVac are calculated using the TCEQ formula for the emissions of the AcuVac SVE system internal combustion engine.

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## 6.3 SVE RESULTS

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During 2014 and 2015 multi-phase recovery events liquid phase and vapor phase PSH was recovered during each event, however, liquid phase recovery was discontinued after 2015 as liquid phase recovery was very low compared to the quantities of generated waste groundwater during each event. From 2019 until the present the SVE events have increased in number per year, as well as from 3-day/28-hour events to 5-day/100-hour events, resulting in progressively higher quantities of PSH recovered each year.

In 2022, PSH recovery was conducted at the VG-4 monitoring well at the Site during three SVE events. The events were conducted February 7 through 11, May 16 through 20, and November 7 through 11, 2022. During each event, Tetra Tech personnel mobilized to the Site to supervise remedial activities conducted by AcuVac.

The February, May, and November events resulted in the vapor phase recovery of 28.73 gallons, 29.19 gallons, and 19.19 gallons of PSH, respectively, resulting in a total recovery of 77.11. While the 2022 PSH recovery is nearly double that of 2021, this is attributed to a similar increase in the total number of hours of SVE between 2021 and 2022. Total PSH recovery to date from VG-4 from dual Phase extraction (2015 and 2015) and SVE is 160.24 gallons

A summary of the SVE events completed to date is provided in **Table 4**. The AcuVac SVE reports documenting remedial activities for 2022 are provided in **Appendix E**.

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## 7.0 2023 WORKPLAN

SVE events continue to be effective for PSH recovery at the Site and semi-annual SVE events at VG-4 are planned for 2022 while a pilot permanent SVE system is priced for the Site with potential implementation during 2023. PSH was measured in VG-4 during the November groundwater monitoring event, and if it continues to persist an evaluation of returning to the use of an absorbent sock will be considered. Groundwater monitoring of the existing Site monitoring well network will be continued on a semi-annual basis, with annual reporting to the NMOCD.

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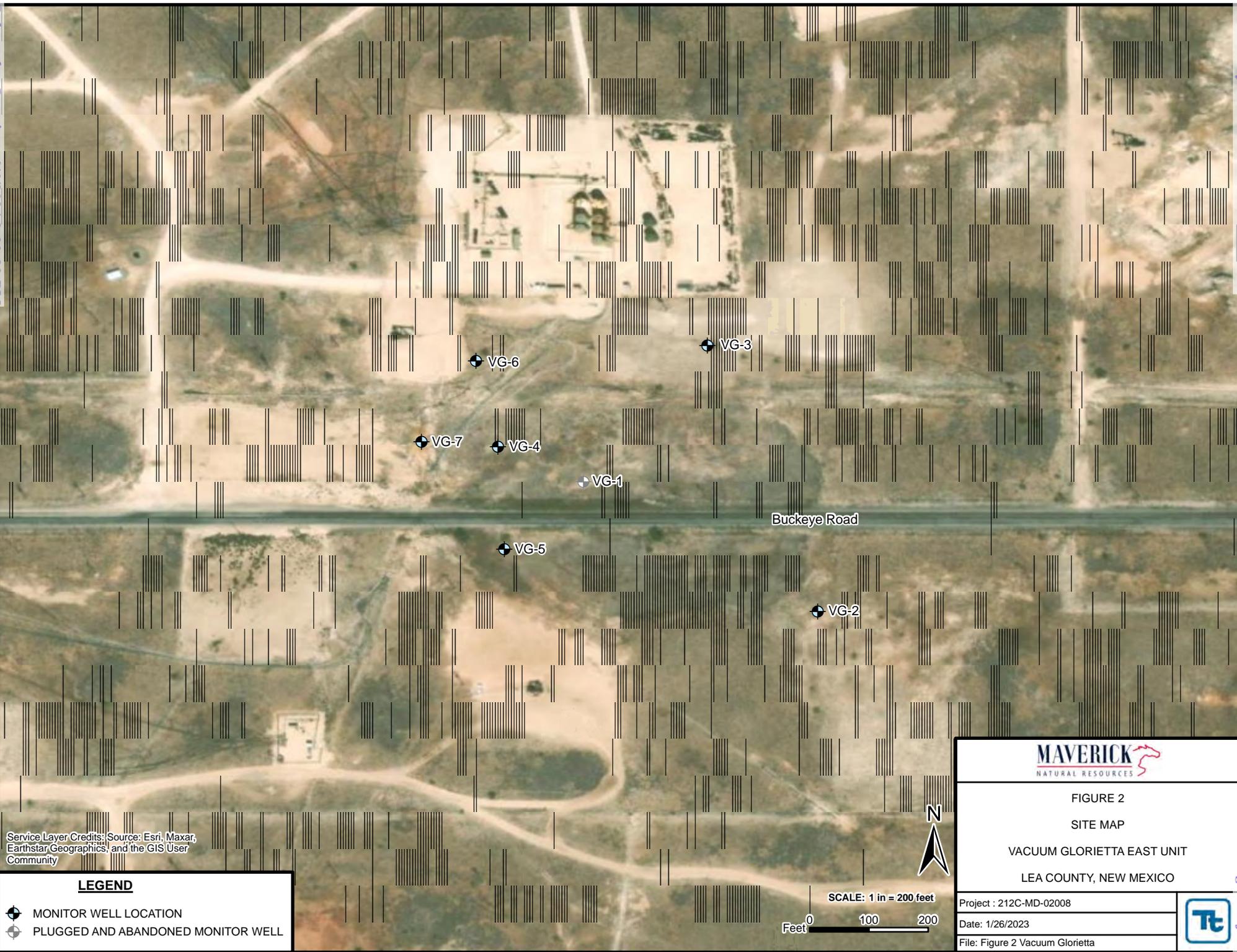
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## 8.0 REFERENCES

Nicholson Jr., A. and Clebsch Jr., A.. (1961). Geology and Ground-Water Conditions in Souther Lea County, New Mexico. Socorro, NM: State Bureau of Mines and Mineral Resources and New Mexico Institute of Mining & Technology Campus Stationauthor.

## FIGURES





Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

**LEGEND**

-  MONITOR WELL LOCATION
-  PLUGGED AND ABANDONED MONITOR WELL

**MAVERICK**  
NATURAL RESOURCES

FIGURE 2  
SITE MAP

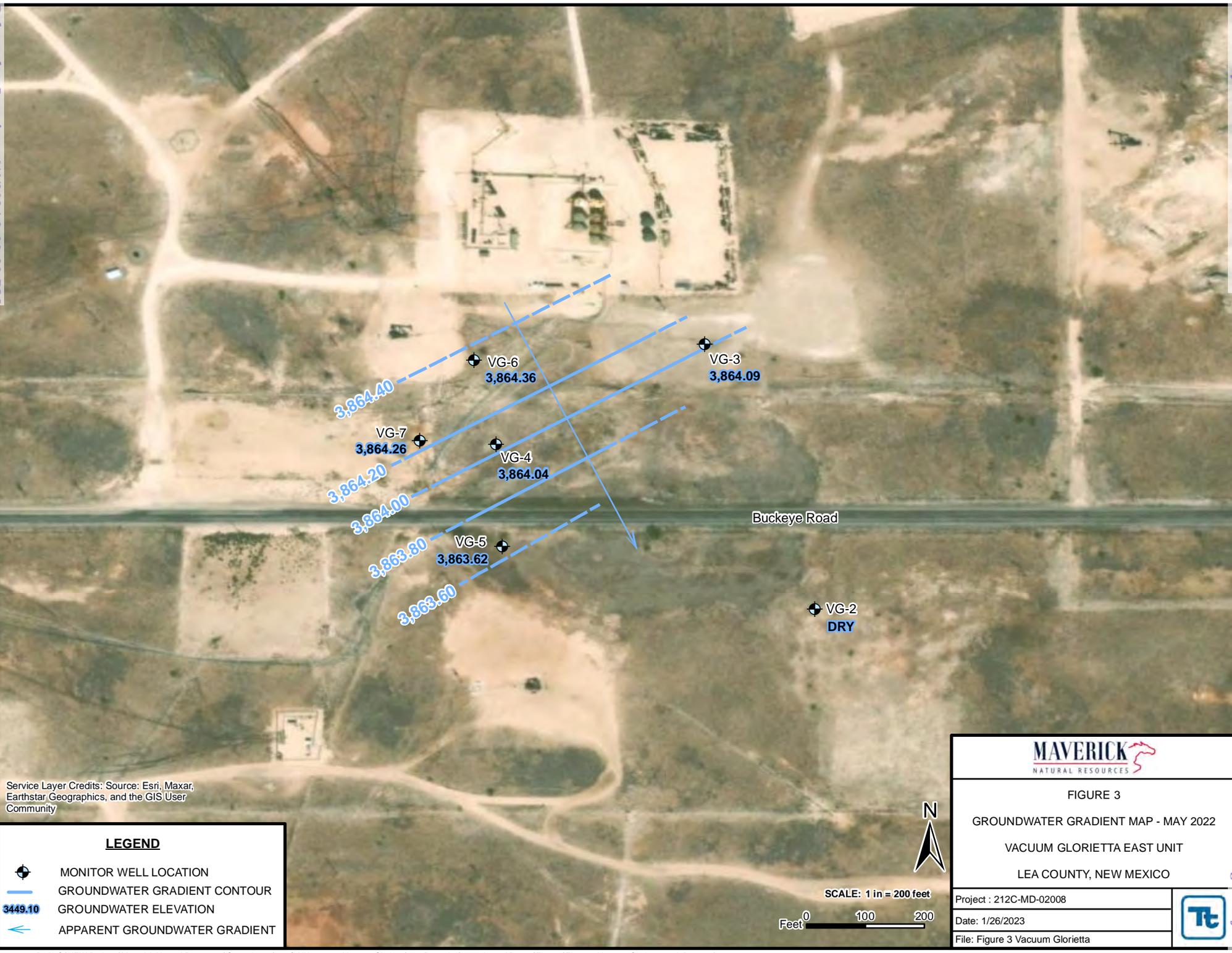
VACUUM GLORIETTA EAST UNIT  
LEA COUNTY, NEW MEXICO

Project : 212C-MD-02008

Date: 1/26/2023

File: Figure 2 Vacuum Glorietta





Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

**LEGEND**

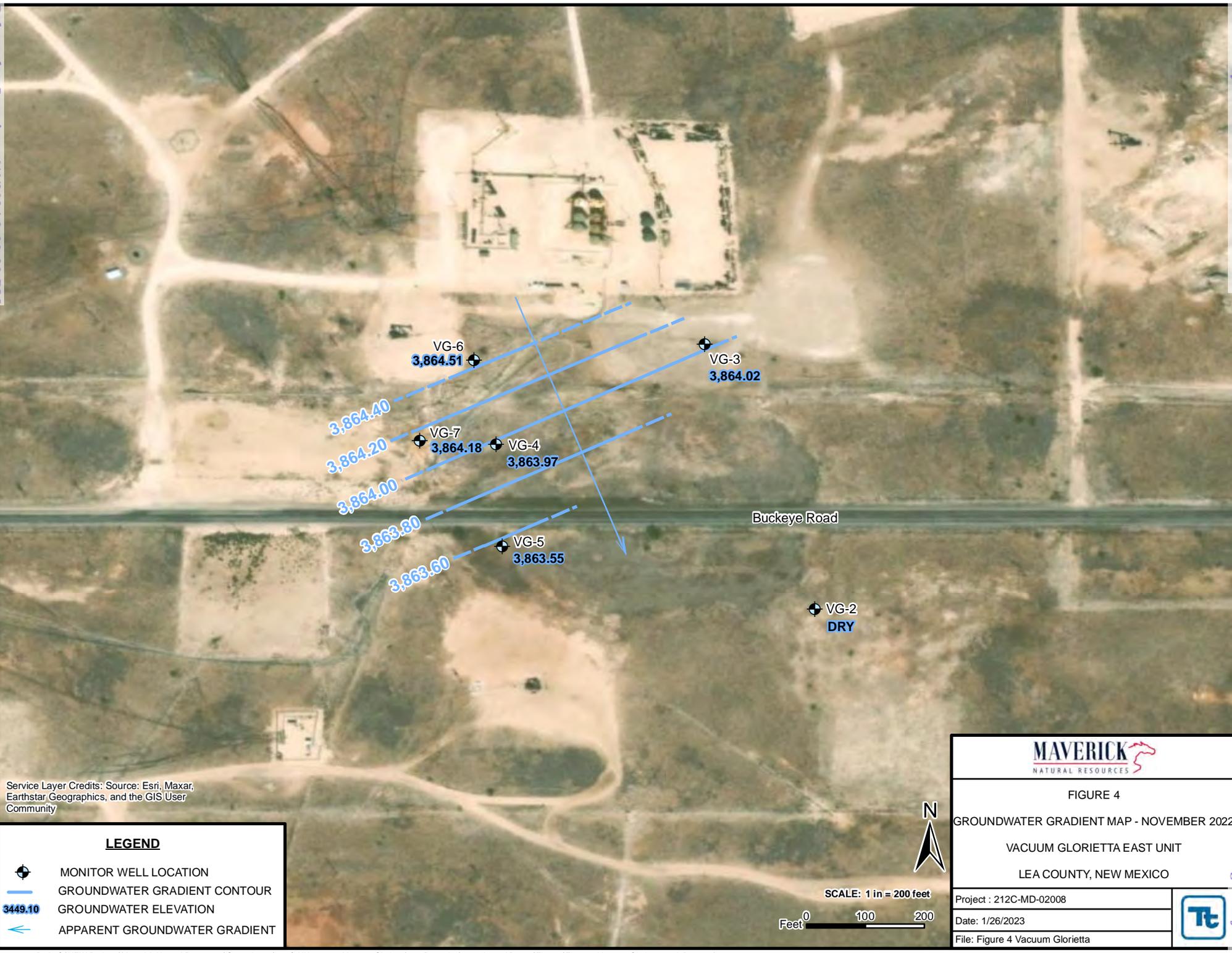
- MONITOR WELL LOCATION
- GROUNDWATER GRADIENT CONTOUR
- GROUNDWATER ELEVATION
- APPARENT GROUNDWATER GRADIENT

**MAVERICK**  
NATURAL RESOURCES

**FIGURE 3**  
GROUNDWATER GRADIENT MAP - MAY 2022  
VACUUM GLORIETTA EAST UNIT  
LEA COUNTY, NEW MEXICO

Project : 212C-MD-02008	
Date: 1/26/2023	
File: Figure 3 Vacuum Glorietta	

SCALE: 1 in = 200 feet  
Feet 0 100 200



Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

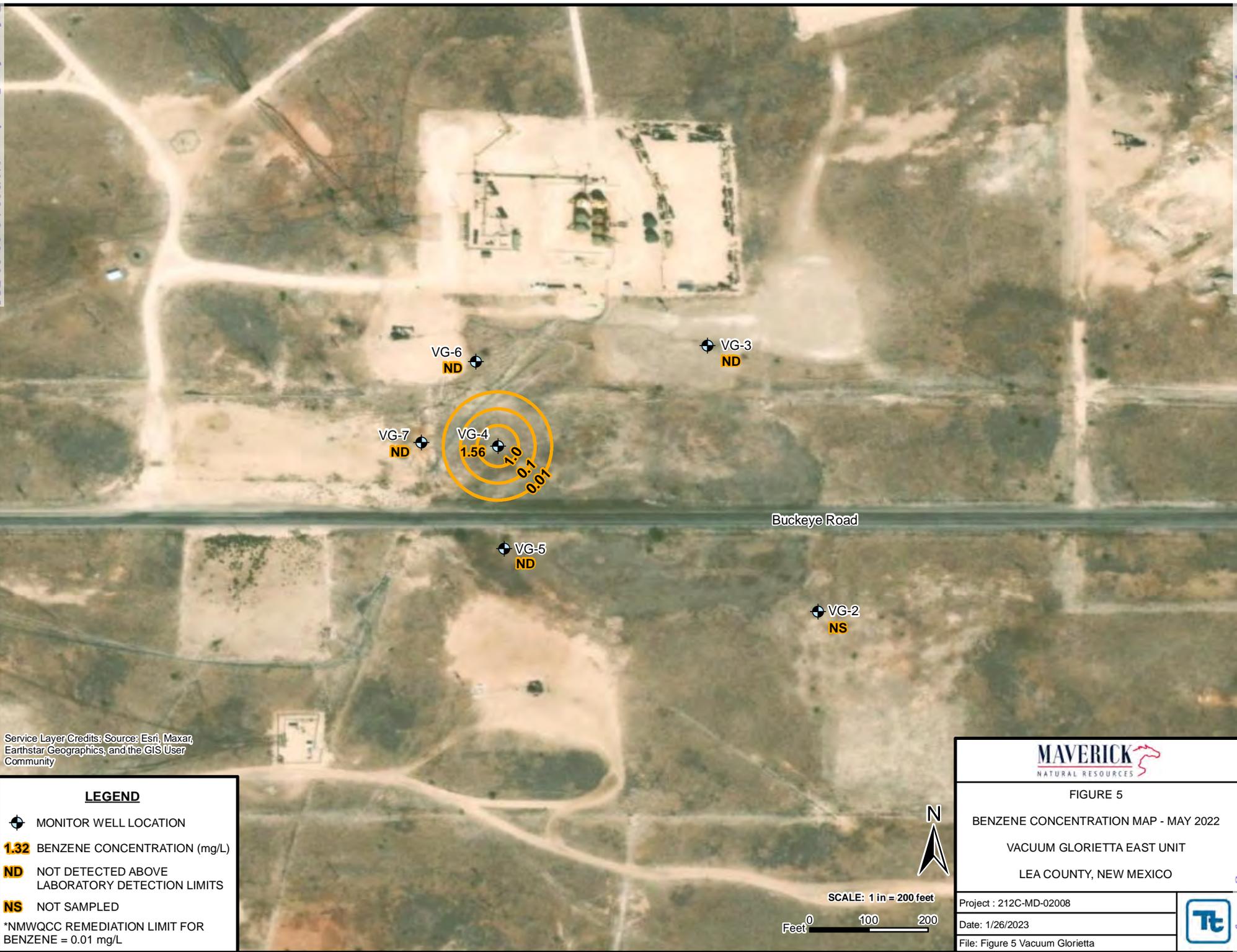
**LEGEND**

- MONITOR WELL LOCATION
- GROUNDWATER GRADIENT CONTOUR
- GROUNDWATER ELEVATION
- APPARENT GROUNDWATER GRADIENT

**MAVERICK**  
NATURAL RESOURCES

FIGURE 4  
GROUNDWATER GRADIENT MAP - NOVEMBER 2022  
VACUUM GLORIETTA EAST UNIT  
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Project : 212C-MD-02008	
Date: 1/26/2023	
File: Figure 4 Vacuum Glorietta	



Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

**LEGEND**

- MONITOR WELL LOCATION
- 1.32** BENZENE CONCENTRATION (mg/L)
- ND** NOT DETECTED ABOVE LABORATORY DETECTION LIMITS
- NS** NOT SAMPLED

\*NMWQCC REMEDIATION LIMIT FOR BENZENE = 0.01 mg/L



SCALE: 1 in = 200 feet  
Feet 0 100 200

<b>MAVERICK</b> NATURAL RESOURCES	
FIGURE 5 BENZENE CONCENTRATION MAP - MAY 2022 VACUUM GLORIETTA EAST UNIT LEA COUNTY, NEW MEXICO	
Project : 212C-MD-02008	
Date: 1/26/2023	
File: Figure 5 Vacuum Glorietta	



Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

**LEGEND**

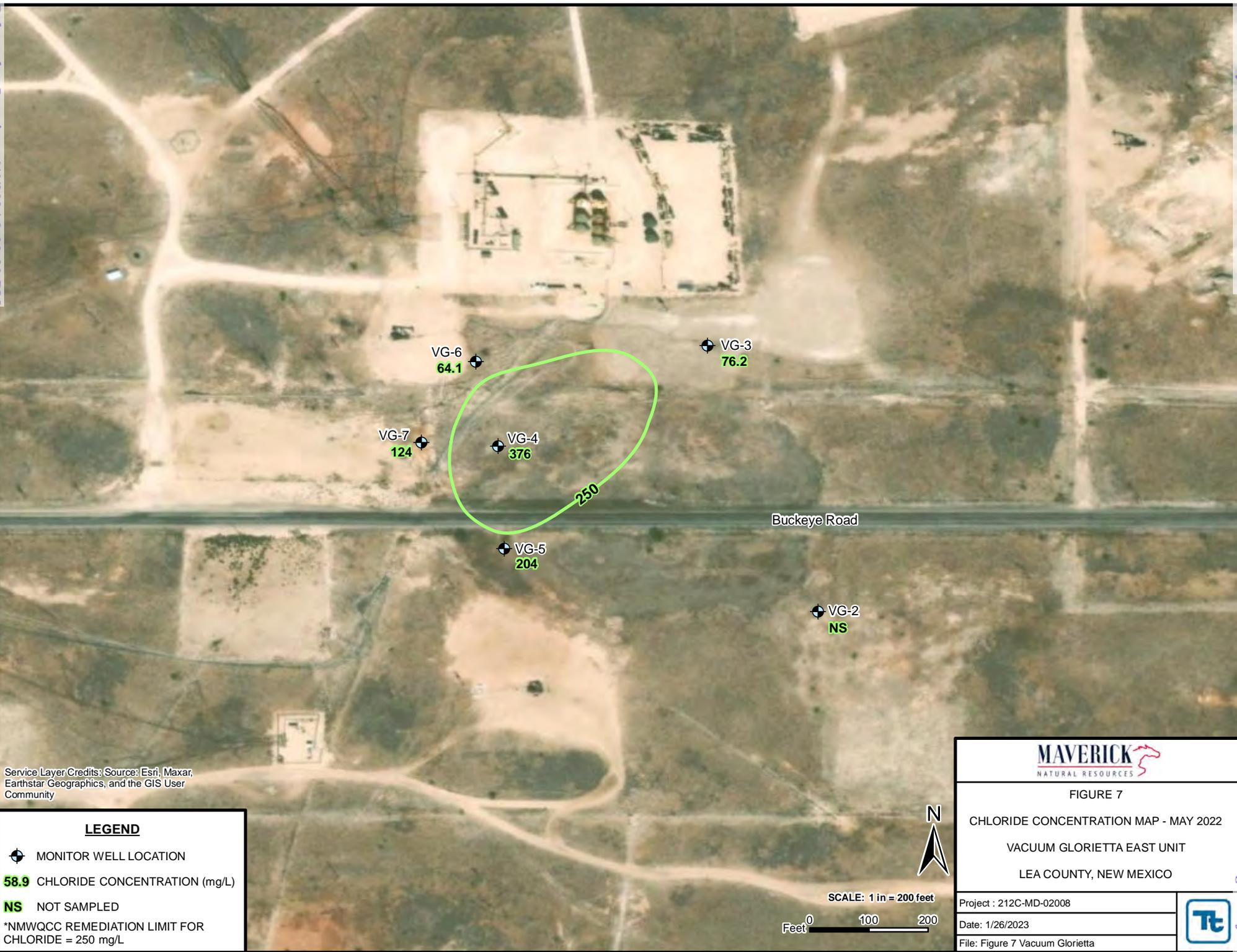
- MONITOR WELL LOCATION
- PSH** PHASE SEPARATED HYDROCARBONS
- ND** NOT DETECTED ABOVE LABORATORY DETECTION LIMITS
- NS** NOT SAMPLED

\*NMWQCC REMEDIATION LIMIT FOR BENZENE = 0.01 mg/L

SCALE: 1 in = 200 feet

0 100 200 Feet

<b>MAVERICK</b> NATURAL RESOURCES	
FIGURE 6 BENZENE CONCENTRATION MAP - NOVEMBER 2022 VACUUM GLORIETTA EAST UNIT LEA COUNTY, NEW MEXICO	
Project : 212C-MD-02008	
Date: 1/26/2023	
File: Figure 6 Vacuum Glorietta	



Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

**LEGEND**

- ⊕ MONITOR WELL LOCATION
- 58.9 CHLORIDE CONCENTRATION (mg/L)
- NS NOT SAMPLED
- \*NMWQCC REMEDIATION LIMIT FOR CHLORIDE = 250 mg/L

**MAVERICK**  
NATURAL RESOURCES

**FIGURE 7**  
CHLORIDE CONCENTRATION MAP - MAY 2022  
VACUUM GLORIETTA EAST UNIT  
LEA COUNTY, NEW MEXICO

Project : 212C-MD-02008	
Date: 1/26/2023	
File: Figure 7 Vacuum Glorietta	



Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

**LEGEND**

- MONITOR WELL LOCATION
- 58.9** CHLORIDE CONCENTRATION (mg/L)
- PSH** PHASE SEPARATED HYDROCARBONS
- NS** NOT SAMPLED
- \*NMWQCC REMEDIATION LIMIT FOR CHLORIDE = 250 mg/L

SCALE: 1 in = 200 feet

Feet 0 100 200

<b>FIGURE 8</b> CHLORIDE CONCENTRATION MAP - NOVEMBER 2022 VACUUM GLORIETTA EAST UNIT LEA COUNTY, NEW MEXICO	
Project : 212C-MD-02008	
Date: 1/26/2023	
File: Figure 8 Vacuum Glorietta	

**TABLES**



**Table 1**  
**Groundwater Elevation Summary**  
**Vacuum Glorietta East Unit**  
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Well ID	Gauging Date	Well Total Depth (feet)	Depth to PSH (feet BTOC)	Depth to Water (feet BTOC)	PSH Thickness (feet)	Top of Casing Elevation (feet AMSL)	PSH Corrected Groundwater Elevation (feet AMSL)
VG-2	5/23/2022	67.70	Dry				
	11/14/2022	67.70	Dry				
VG-3	5/23/2022	68.41	-	67.06	-	3,931.15	<b>3,864.09</b>
	11/14/2022	68.41	-	67.13	-	3,931.15	<b>3,864.02</b>
VG-4	5/23/2022	70.70	-	67.89	-	3,931.93	<b>3,864.04</b>
	11/14/2022	70.70	67.93	67.96	0.03	3,931.93	<b>3,863.99</b>
VG-5	5/23/2022	75.15	-	66.90	-	3,930.52	<b>3,863.62</b>
	11/14/2022	75.15	-	66.97	-	3,930.52	<b>3,863.55</b>
VG-6	5/23/2022	79.72	-	70.80	-	3,935.16	<b>3,864.36</b>
	11/14/2022	79.72	-	70.65	-	3,935.16	<b>3,864.51</b>
VG-7	5/23/2022	79.86	-	70.52	-	3,934.78	<b>3,864.26</b>
	11/14/2022	79.86	-	70.60	-	3,934.78	<b>3,864.18</b>

Notes:

BTOC: Below Top of Casing

AMSL: Above Mean Sea Level

PSH: Phase-Separated Hydrocarbons

PSH Corrected Groundwater Elevation: PSH assumed density of 0.8



**Table 2**  
**Monitor Wells**  
**Groundwater Analytical Summary**  
**Vacuum Glorietta East Unit**  
**Lea County, New Mexico**

Well ID	Sample Date	Chloride (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)
<b>NMWQCC Groundwater Quality Standards</b>		<b>250</b>	<b>0.01</b>	<b>0.75</b>	<b>0.75</b>	<b>0.62</b>
<b>VG-2</b>	5/23/2022	Not Sampled - Dry				
	11/14/2022	Not Sampled - Dry				
<b>VG-3</b>	5/23/2022	76.2	< 0.002	< 0.005	< 0.002	< 0.006
	11/15/2022	59.7	< 0.001	< 0.001	< 0.001	< 0.003
<b>VG-4</b>	5/23/2022	376	1.56	0.0135	0.671	0.397
	11/15/2022	Not Sampled - PSH				
<b>VG-5</b>	5/23/2022	204	< 0.002	< 0.005	< 0.002	< 0.006
	11/16/2022	248	< 0.001	< 0.001	< 0.001	< 0.003
<b>VG-6</b>	5/23/2022	64.1	< 0.002	< 0.005	< 0.002	< 0.006
	11/15/2022	126	< 0.001	< 0.001	< 0.001	< 0.003
<b>VG-7</b>	5/23/2022	124	< 0.002	< 0.005	< 0.002	< 0.006
	11/15/2022	137	< 0.001	< 0.001	< 0.001	< 0.003

Notes:

NMWQCC: New Mexico Water Quality Control Commission

Exceeds applicable regulatory standards

TDS: Total Dissolved Solids

J: The identification of the analyte is acceptable; the reported value is an estimate



**Table 3**  
**Quality Assurance/Quality Control Summary**  
**Vacuum Glorietta East Unit**  
**Lea County, New Mexico**

Well ID	Sample Date	Analyte	Primary Sample Result (mg/L)	Duplicate Sample Result (mg/L)	RPD	Within DQOs
VG-4	5/23/2022	Chloride	376	374	0.5%	Yes
		Benzene	1.56	1.68	7.4%	Yes
		Toluene	0.0135	0.0111	19.5%	Yes
		Ethylbenzene	0.671	0.161	122.6%	<b>No</b>
		Xylene	0.397	0.377	5.2%	Yes
VG-7	11/16/2022	Chloride	137	135	1.5%	Yes
		Benzene	< 0.001	< 0.001	N/A	N/A
		Toluene	< 0.001	< 0.001	N/A	N/A
		Ethylbenzene	< 0.001	< 0.001	N/A	N/A
		Xylene	< 0.003	< 0.003	N/A	N/A

Notes:

RPD: Relative Percent Difference calculated as =  $(SR-DR) * 200 / (SR+DR)$

DQO: Data Quality Objectives

ND: Not Detected above the laboratory method detection limit

N/A: Not Applicable



**Table 4**  
**AcuVac SVE Summary**  
**Vacuum Glorietta East Unit**  
**Lea County, New Mexico**

Event Number	Event Date	Duration (hours)	PSH Recovery (Vapor Phase gallons)	PSH Recovery (Liquid Phase gallons)	Total PSH Recovery (gallons)	Average PSH Vapor Phase Recovery (gallons per hour)
1	9/8/2014	5	2.66	0.95	6.05	0.553
	9/9/2014	3	1.76	0.68		
2	5/4/2015	5	1.48	1.24	14.51	0.340
	5/5/2015	11	3.72	2.90		
	5/6/2015	8	2.96	2.21		
3	6/11/2019	10	3.41	0	9.78	0.349
	6/12/2019	10	3.62	0		
	6/13/2019	8	2.75	0		
4	5/5/2020	10	3.21	0	11.88	0.424
	5/6/2020	10	4.49	0		
	5/7/2020	8	4.18	0		
5	2/23/2021	10	1.58	0	7.69	0.202
	2/24/2021	10	1.76	0		
	2/25/2021	10	2.25	0		
	2/26/2021	8	2.10	0		
6	5/3/2021	10	2.25	0	10.34	0.272
	5/4/2021	10	2.73	0		
	5/5/2021	10	2.73	0		
	5/6/2021	8	2.63	0		
7	7/26/2021	9	2.67	0	10.49	0.284
	7/27/2021	10	2.85	0		
	7/28/2021	10	2.63	0		
	7/29/2021	8	2.34	0		
8	11/8/2021	10	3.17	0	12.39	0.326
	11/9/2021	10	3.40	0		
	11/10/2021	10	3.19	0		
	11/11/2021	8	2.63	0		
9	2/7/2022	16	4.28	0	28.73	0.287
	2/8/2022	24	6.86	0		
	2/9/2022	24	7.02	0		
	2/10/2022	24	7.06	0		
	2/11/2022	12	3.51	0		
10	5/16/2022	24	6.72	0	29.19	0.292
	5/17/2022	24	7.35	0		
	5/18/2022	24	6.98	0		
	5/19/2022	24	6.98	0		
	5/20/2022	4	1.16	0		
11	11/7/2022	24	4.47	0	19.19	0.192
	11/8/2022	24	4.46	0		
	11/9/2022	24	5.11	0		
	11/10/2022	24	4.50	0		
	11/11/2022	4	0.65	0		

Notes:

PSH Vapor Phase Recovery: Calculated using Texas Commission on Environmental Quality formula for emissions.

## APPENDIX A: LABORATORY ANALYTICAL DATA



# ANALYTICAL REPORT

June 07, 2022

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

## ConocoPhillips - Tetra Tech

Sample Delivery Group: L1498263  
 Samples Received: 05/25/2022  
 Project Number: 212C-MD-02397A  
 Description: COP- Vacuum Glorietta

Report To: Julie Evans  
 901 West Wall  
 Suite 100  
 Midland, TX 79701

Entire Report Reviewed By:

Chris McCord  
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



Pace Analytical Services, LLC -Dallas

400 W. Bethany Drive Suite 190 Allen, TX 75013 972-727-1123 800-767-5859 www.pacenational.com

<b>Cp: Cover Page</b>	<b>1</b>	
<b>Tc: Table of Contents</b>	<b>2</b>	
<b>Ss: Sample Summary</b>	<b>3</b>	
<b>Cn: Case Narrative</b>	<b>4</b>	
<b>Sr: Sample Results</b>	<b>5</b>	
<b>VG-3 L1498263-01</b>	<b>5</b>	
<b>VG-6 L1498263-02</b>	<b>6</b>	
<b>VG-7 L1498263-03</b>	<b>7</b>	
<b>VG-5 L1498263-04</b>	<b>8</b>	
<b>VG-4 L1498263-05</b>	<b>9</b>	
<b>DUP L1498263-06</b>	<b>10</b>	
<b>Qc: Quality Control Summary</b>	<b>11</b>	
<b>Wet Chemistry by Method 9056A</b>	<b>11</b>	
<b>Volatile Organic Compounds (GC/MS) by Method 8260</b>	<b>12</b>	
<b>Gl: Glossary of Terms</b>	<b>14</b>	
<b>Al: Accreditations &amp; Locations</b>	<b>15</b>	
<b>Sc: Sample Chain of Custody</b>	<b>16</b>	

VG-3 L1498263-01 GW

Collected by Matthew Castrejan  
 Collected date/time 05/23/22 11:20  
 Received date/time 05/25/22 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1874582	1	06/06/22 01:41	06/06/22 01:41	EIG	Allen, TX
Volatile Organic Compounds (GC/MS) by Method 8260	WG1871142	1	05/29/22 00:51	05/29/22 00:51	ZST	Allen, TX



VG-6 L1498263-02 GW

Collected by Matthew Castrejan  
 Collected date/time 05/23/22 12:35  
 Received date/time 05/25/22 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1874582	1	06/06/22 01:58	06/06/22 01:58	EIG	Allen, TX
Volatile Organic Compounds (GC/MS) by Method 8260	WG1871142	1	05/29/22 01:09	05/29/22 01:09	ZST	Allen, TX

VG-7 L1498263-03 GW

Collected by Matthew Castrejan  
 Collected date/time 05/23/22 13:50  
 Received date/time 05/25/22 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1874582	1	06/06/22 02:52	06/06/22 02:52	EIG	Allen, TX
Volatile Organic Compounds (GC/MS) by Method 8260	WG1871142	1	05/29/22 01:27	05/29/22 01:27	ZST	Allen, TX

VG-5 L1498263-04 GW

Collected by Matthew Castrejan  
 Collected date/time 05/23/22 15:20  
 Received date/time 05/25/22 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1874582	1	06/06/22 03:10	06/06/22 03:10	EIG	Allen, TX
Volatile Organic Compounds (GC/MS) by Method 8260	WG1871142	1	05/29/22 01:45	05/29/22 01:45	ZST	Allen, TX

VG-4 L1498263-05 GW

Collected by Matthew Castrejan  
 Collected date/time 05/23/22 16:35  
 Received date/time 05/25/22 08:00

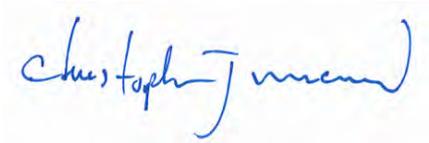
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1874582	1	06/06/22 10:05	06/06/22 10:05	EIG	Allen, TX
Volatile Organic Compounds (GC/MS) by Method 8260	WG1871142	1	05/29/22 02:03	05/29/22 02:03	ZST	Allen, TX
Volatile Organic Compounds (GC/MS) by Method 8260	WG1871493	10	05/31/22 10:29	05/31/22 10:29	ZST	Allen, TX

DUP L1498263-06 GW

Collected by Matthew Castrejan  
 Collected date/time 05/23/22 16:35  
 Received date/time 05/25/22 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1874582	1	06/06/22 10:23	06/06/22 10:23	EIG	Allen, TX
Volatile Organic Compounds (GC/MS) by Method 8260	WG1871142	1	05/29/22 02:21	05/29/22 02:21	ZST	Allen, TX
Volatile Organic Compounds (GC/MS) by Method 8260	WG1871493	10	05/31/22 10:47	05/31/22 10:47	ZST	Allen, TX

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chris McCord  
Project Manager

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Collected date/time: 05/23/22 11:20

L1498263

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Chloride	76.2		0.0541	0.800	1	06/06/2022 01:41	<a href="#">WG1874582</a>

1 Cp

2 Tc

Volatile Organic Compounds (GC/MS) by Method 8260

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Benzene	U		0.000493	0.00200	1	05/29/2022 00:51	<a href="#">WG1871142</a>
Ethylbenzene	U		0.000462	0.00200	1	05/29/2022 00:51	<a href="#">WG1871142</a>
Toluene	U		0.000998	0.00500	1	05/29/2022 00:51	<a href="#">WG1871142</a>
Xylenes, Total	U		0.00132	0.00600	1	05/29/2022 00:51	<a href="#">WG1871142</a>
(S) 1,2-Dichloroethane-d4	91.1			70.0-130		05/29/2022 00:51	<a href="#">WG1871142</a>
(S) 4-Bromofluorobenzene	104			70.0-130		05/29/2022 00:51	<a href="#">WG1871142</a>
(S) Toluene-d8	97.2			70.0-130		05/29/2022 00:51	<a href="#">WG1871142</a>

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Collected date/time: 05/23/22 12:35

L1498263

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Chloride	64.1		0.0541	0.800	1	06/06/2022 01:58	<a href="#">WG1874582</a>

1 Cp

2 Tc

Volatile Organic Compounds (GC/MS) by Method 8260

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Benzene	U		0.000493	0.00200	1	05/29/2022 01:09	<a href="#">WG1871142</a>
Ethylbenzene	U		0.000462	0.00200	1	05/29/2022 01:09	<a href="#">WG1871142</a>
Toluene	U		0.000998	0.00500	1	05/29/2022 01:09	<a href="#">WG1871142</a>
Xylenes, Total	U		0.00132	0.00600	1	05/29/2022 01:09	<a href="#">WG1871142</a>
(S) 1,2-Dichloroethane-d4	90.2			70.0-130		05/29/2022 01:09	<a href="#">WG1871142</a>
(S) 4-Bromofluorobenzene	103			70.0-130		05/29/2022 01:09	<a href="#">WG1871142</a>
(S) Toluene-d8	96.1			70.0-130		05/29/2022 01:09	<a href="#">WG1871142</a>

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Collected date/time: 05/23/22 13:50

L1498263

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Chloride	124		0.0541	0.800	1	06/06/2022 02:52	<a href="#">WG1874582</a>

1 Cp

2 Tc

Volatile Organic Compounds (GC/MS) by Method 8260

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Benzene	U		0.000493	0.00200	1	05/29/2022 01:27	<a href="#">WG1871142</a>
Ethylbenzene	U		0.000462	0.00200	1	05/29/2022 01:27	<a href="#">WG1871142</a>
Toluene	U		0.000998	0.00500	1	05/29/2022 01:27	<a href="#">WG1871142</a>
Xylenes, Total	U		0.00132	0.00600	1	05/29/2022 01:27	<a href="#">WG1871142</a>
(S) 1,2-Dichloroethane-d4	90.3			70.0-130		05/29/2022 01:27	<a href="#">WG1871142</a>
(S) 4-Bromofluorobenzene	102			70.0-130		05/29/2022 01:27	<a href="#">WG1871142</a>
(S) Toluene-d8	96.6			70.0-130		05/29/2022 01:27	<a href="#">WG1871142</a>

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Collected date/time: 05/23/22 15:20

L1498263

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Chloride	204		0.0541	0.800	1	06/06/2022 03:10	<a href="#">WG1874582</a>

1 Cp

2 Tc

Volatile Organic Compounds (GC/MS) by Method 8260

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Benzene	U		0.000493	0.00200	1	05/29/2022 01:45	<a href="#">WG1871142</a>
Ethylbenzene	U		0.000462	0.00200	1	05/29/2022 01:45	<a href="#">WG1871142</a>
Toluene	U		0.000998	0.00500	1	05/29/2022 01:45	<a href="#">WG1871142</a>
Xylenes, Total	U		0.00132	0.00600	1	05/29/2022 01:45	<a href="#">WG1871142</a>
(S) 1,2-Dichloroethane-d4	91.9			70.0-130		05/29/2022 01:45	<a href="#">WG1871142</a>
(S) 4-Bromofluorobenzene	104			70.0-130		05/29/2022 01:45	<a href="#">WG1871142</a>
(S) Toluene-d8	96.6			70.0-130		05/29/2022 01:45	<a href="#">WG1871142</a>

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Collected date/time: 05/23/22 16:35

L1498263

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Chloride	376		0.0541	0.800	1	06/06/2022 10:05	<a href="#">WG1874582</a>

Volatile Organic Compounds (GC/MS) by Method 8260

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Benzene	1.56		0.00493	0.0200	10	05/31/2022 10:29	<a href="#">WG1871493</a>
Ethylbenzene	0.671		0.00462	0.0200	10	05/31/2022 10:29	<a href="#">WG1871493</a>
Toluene	0.0135		0.000998	0.00500	1	05/29/2022 02:03	<a href="#">WG1871142</a>
Xylenes, Total	0.397		0.0132	0.0600	10	05/31/2022 10:29	<a href="#">WG1871493</a>
(S) 1,2-Dichloroethane-d4	90.2			70.0-130		05/29/2022 02:03	<a href="#">WG1871142</a>
(S) 1,2-Dichloroethane-d4	86.2			70.0-130		05/31/2022 10:29	<a href="#">WG1871493</a>
(S) 4-Bromofluorobenzene	103			70.0-130		05/29/2022 02:03	<a href="#">WG1871142</a>
(S) 4-Bromofluorobenzene	102			70.0-130		05/31/2022 10:29	<a href="#">WG1871493</a>
(S) Toluene-d8	106			70.0-130		05/29/2022 02:03	<a href="#">WG1871142</a>
(S) Toluene-d8	96.5			70.0-130		05/31/2022 10:29	<a href="#">WG1871493</a>

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Collected date/time: 05/23/22 16:35

L1498263

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Chloride	374		0.0541	0.800	1	06/06/2022 10:23	<a href="#">WG1874582</a>

1 Cp

2 Tc

Volatile Organic Compounds (GC/MS) by Method 8260

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Benzene	1.68		0.00493	0.0200	10	05/31/2022 10:47	<a href="#">WG1871493</a>
Ethylbenzene	0.161		0.000462	0.00200	1	05/29/2022 02:21	<a href="#">WG1871142</a>
Toluene	0.0111		0.000998	0.00500	1	05/29/2022 02:21	<a href="#">WG1871142</a>
Xylenes, Total	0.377		0.0132	0.0600	10	05/31/2022 10:47	<a href="#">WG1871493</a>
(S) 1,2-Dichloroethane-d4	87.7			70.0-130		05/29/2022 02:21	<a href="#">WG1871142</a>
(S) 1,2-Dichloroethane-d4	86.7			70.0-130		05/31/2022 10:47	<a href="#">WG1871493</a>
(S) 4-Bromofluorobenzene	105			70.0-130		05/29/2022 02:21	<a href="#">WG1871142</a>
(S) 4-Bromofluorobenzene	101			70.0-130		05/31/2022 10:47	<a href="#">WG1871493</a>
(S) Toluene-d8	106			70.0-130		05/29/2022 02:21	<a href="#">WG1871142</a>
(S) Toluene-d8	96.0			70.0-130		05/31/2022 10:47	<a href="#">WG1871493</a>

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 9056A

[L1498263-01,02,03,04,05,06](#)

Method Blank (MB)

(MB) R3799811-1 06/05/22 19:44

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Chloride	0.131	↓	0.0541	0.800

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

Laboratory Control Sample (LCS)

(LCS) R3799811-2 06/05/22 20:01

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Chloride	5.00	4.80	96.0	80.0-120	

<sup>4</sup>Cn

<sup>5</sup>Sr

L1496989-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1496989-02 06/06/22 01:05 • (MS) R3799811-3 06/05/22 20:19 • (MSD) R3799811-4 06/05/22 20:37

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Chloride	25.0	12.8	37.2	37.1	97.6	97.2	1	80.0-120			0.228	20

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

L1496992-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1496992-02 06/06/22 01:23 • (MS) R3799811-5 06/05/22 20:55 • (MSD) R3799811-6 06/05/22 21:13

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Chloride	50.0	66.6	117	116	102	99.1	1	80.0-120			1.05	20

<sup>9</sup>Sc

Volatile Organic Compounds (GC/MS) by Method 8260

[L1498263-01,02,03,04,05,06](#)

Method Blank (MB)

(MB) R3797477-2 05/28/22 19:29

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000493	0.00200
Ethylbenzene	U		0.000462	0.00200
Toluene	U		0.000998	0.00500
Xylenes, Total	U		0.00132	0.00600
(S) 1,2-Dichloroethane-d4	84.4			70.0-130
(S) 4-Bromofluorobenzene	104			70.0-130
(S) Toluene-d8	97.4			70.0-130

Laboratory Control Sample (LCS)

(LCS) R3797477-1 05/28/22 18:54

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Benzene	0.0200	0.0192	96.0	73.0-131	
Ethylbenzene	0.0200	0.0211	105	76.0-129	
Toluene	0.0200	0.0194	97.0	73.0-130	
Xylenes, Total	0.0600	0.0602	100	78.0-124	
(S) 1,2-Dichloroethane-d4			83.0	70.0-130	
(S) 4-Bromofluorobenzene			104	70.0-130	
(S) Toluene-d8			97.2	70.0-130	

L1498754-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1498754-07 05/28/22 20:58 • (MS) R3797477-3 05/28/22 19:47 • (MSD) R3797477-4 05/28/22 20:05

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Benzene	0.0200	U	0.0178	0.0172	89.0	86.0	1	74.0-130			3.43	20
Ethylbenzene	0.0200	U	0.0194	0.0190	97.0	95.0	1	77.0-127			2.08	20
Toluene	0.0200	U	0.0177	0.0174	88.5	87.0	1	74.0-127			1.71	20
Xylenes, Total	0.0600	U	0.0557	0.0546	92.8	91.0	1	71.0-133			1.99	20
(S) 1,2-Dichloroethane-d4					84.2	84.1		70.0-130				
(S) 4-Bromofluorobenzene					104	104		70.0-130				
(S) Toluene-d8					96.4	97.4		70.0-130				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260

[L1498263-05.06](#)

Method Blank (MB)

(MB) R3797684-2 05/31/22 09:35

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000493	0.00200
Ethylbenzene	U		0.000462	0.00200
Xylenes, Total	U		0.00132	0.00600
(S) 1,2-Dichloroethane-d4	86.6			70.0-130
(S) 4-Bromofluorobenzene	103			70.0-130
(S) Toluene-d8	96.0			70.0-130

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

Laboratory Control Sample (LCS)

(LCS) R3797684-1 05/31/22 08:25

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	mg/l	mg/l	%	%	
Benzene	0.0200	0.0192	96.0	73.0-131	
Ethylbenzene	0.0200	0.0207	104	76.0-129	
Xylenes, Total	0.0600	0.0592	98.7	78.0-124	
(S) 1,2-Dichloroethane-d4			85.6	70.0-130	
(S) 4-Bromofluorobenzene			102	70.0-130	
(S) Toluene-d8			96.7	70.0-130	

6 Qc

7 Gl

8 Al

9 Sc

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.
Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 GI

8 AI

9 Sc

Pace Analytical Services, LLC -Dallas 400 W. Bethany Drive Suite 190 Allen, TX 75013

Arkansas	88-0647	Kansas	E10388
Florida	E871118	Texas	T104704232-22-35
Iowa	408	Oklahoma	8727
Louisiana	30686		

- <sup>1</sup>Cp
- <sup>2</sup>Tc
- <sup>3</sup>Ss
- <sup>4</sup>Cn
- <sup>5</sup>Sr
- <sup>6</sup>Qc
- <sup>7</sup>Gl
- <sup>8</sup>Al
- <sup>9</sup>Sc

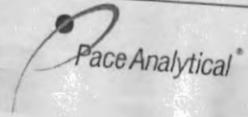
<sup>1</sup> Drinking Water <sup>2</sup> Underground Storage Tanks <sup>3</sup> Aquatic Toxicity <sup>4</sup> Chemical/Microbiological <sup>5</sup> Mold <sup>6</sup> Wastewater n/a Accreditation not applicable

\* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

\* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

Company Name/Address: <b>ConocoPhillips - Tetra Tech</b>		Billing Information: <b>Accounts Payable 901 West Wall Suite 100 Midland, TX 79701</b>		Pres Chk	Analysis / Container / Preservative						Chain of Custody Page ___ of ___		
901 West Wall Suite 100 Midland, TX 79701		Email To: julie.evans@tetrattech.com										 <b>ALLEN, TX</b> <small>400 W. Bethany Drive Suite 190 Allen, TX 75013                  Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <a href="https://info.pacelabs.com/hubs/pas-standard-terms.pdf">https://info.pacelabs.com/hubs/pas-standard-terms.pdf</a></small>	
Report to: <b>Julie Evans</b>		City/State Collected:		Please Circle: PT MT CT ET		CHLORIDE 500mlHDPE-NoPres V8260BTEX 40mlCr-HCI						SDG # <b>L1498263</b>	
Project Description: <b>COP- Vacuum Glorietta</b>		Client Project # <b>212C-MD-02397A</b>		Lab Project # <b>COPTETRA-VACUUM</b>								Table #	
Phone: <b>432-687-8137</b>		Site/Facility ID #		P.O. #								Acctnum: <b>COPTETRA</b>	
Collected by (print): <i>Matthew Castrojar</i>		Rush? (Lab MUST Be Notified)		Quote #								Template: <b>T209570</b>	
Collected by (signature): <i>Matthew Castrojar</i>		___ Same Day ___ Five Day ___ Next Day ___ 5 Day (Rad Only) ___ Two Day ___ 10 Day (Rad Only) ___ Three Day		Date Results Needed		Prelogin: <b>P925304</b>							
Immediately Packed on Ice N ___ Y <input checked="" type="checkbox"/>						PM: <b>526 - Chris McCord</b>							
Sample ID		Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Shipped Via: <b>FedEX Ground</b>		Remarks		Sample # (lab only)	
VG-3	G	GW			5-23-22	1120	4	X	X				-01
VG-6	G	GW				1235	4	X	X				-02
VG-7	G	GW				1350	4	X	X				-03
VG-5	G	GW				1520	4	X	X				-04
VG-4	G	GW				1635	4	X	X				-05
Dup		GW					4	X	X				-06
		GW					4	X	X				
		GW					4	X	X				
		GW					4	X	X				

* Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater DW - Drinking Water OT - Other _____		Remarks:		pH _____ Temp _____		Flow _____ Other _____		Sample Receipt Checklist COC Seal Present/Intact: ___ NP ___ Y ___ N COC Signed/Accurate: ___ Y ___ N Bottles arrive intact: ___ Y ___ N Correct bottles used: ___ Y ___ N Sufficient volume sent: ___ Y ___ N If Applicable VOA Zero Headspace: ___ Y ___ N Preservation Correct/Checked: ___ Y ___ N RAD Screen <0.5 mR/hr: ___ Y ___ N					
Samples returned via: ___ UPS ___ FedEx ___ Courier _____		Tracking #		Relinquished by: (Signature) <i>Matthew Castrojar</i>		Date: 5-24-22		Time: 0800		Received by: (Signature) <i>Swoilshhe PACE.</i>		Trip Blank Received: Yes / No HCL / MeOH TBR	
Relinquished by: (Signature) <i>GM</i>		Date: 5/24/22		Time: 0800		Received by: (Signature)		Temp: °C		Bottles Received:		If preservation required by Login: Date/Time	
Relinquished by: (Signature)		Date:		Time:		Received for lab by: (Signature)		Date:		Time:		Hold:	
												Condition: NCF / OK	

	Document Name: Sample Condition Upon Receipt	Document Revised: 7/27/20 Page 1 of 1
	Document No.: F-DAL-C-001-rev.14	Issuing Authority: Pace Dallas Quality Office

### Sample Condition Upon Receipt

Dallas  
  Ft Worth  
  Corpus Christi  
  Austin

L1498263

Client Name: ConocoPhillips - Tetra Tech Project Work order (place label):  
 Courier: FedEX  UPS  USPS  Client  LSO  PACE  Other: GH  
 Tracking #: \_\_\_\_\_

Custody Seal on Cooler/Box: Yes  No   
 Received on ice: Wet  Blue  No ice   
 Receiving Lab 1 Thermometer Used: IR-17 Cooler Temp °C: 0.7 (Recorded) -0.3 (Correction Factor) 0.4 (Actual)  
 Receiving Lab 2 Thermometer Used: \_\_\_\_\_ Cooler Temp °C: \_\_\_\_\_ (Recorded) \_\_\_\_\_ (Correction Factor) \_\_\_\_\_ (Actual)

Temperature should be above freezing to 6°C unless collected same day as receipt in which evidence of cooling is acceptable

Triage Person: SM Date: 5/26/22

Chain of Custody relinquished	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Sampler name & signature on COC	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Short HT analyses (<72 hrs)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

Login Person: Thinh Pham Date: 05/25/22

Sufficient Volume received	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Correct Container used	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Container Intact	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Sample pH Acceptable pH Strips: _____	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
Residual Chlorine Present Cl Strips: _____	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
Sulfide Present Lead Acetate Strips: _____	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
Are soil samples (volatiles, TPH) received in 5035A Kits (not applicable to TCLP VOA or PST Program TPH)	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
Unpreserved 5035A soil frozen within 48 hrs	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
Headspace in VOA (>6mm)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA <input type="checkbox"/>
Project sampled in USDA Regulated Area outside of Texas State Sampled: _____	Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input checked="" type="checkbox"/>
Non-Conformance(s):	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

Labeling Person (if different than log-in): \_\_\_\_\_ Date: \_\_\_\_\_



# ANALYTICAL REPORT

November 30, 2022

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

## Tetra Tech EMI - Houston, TX

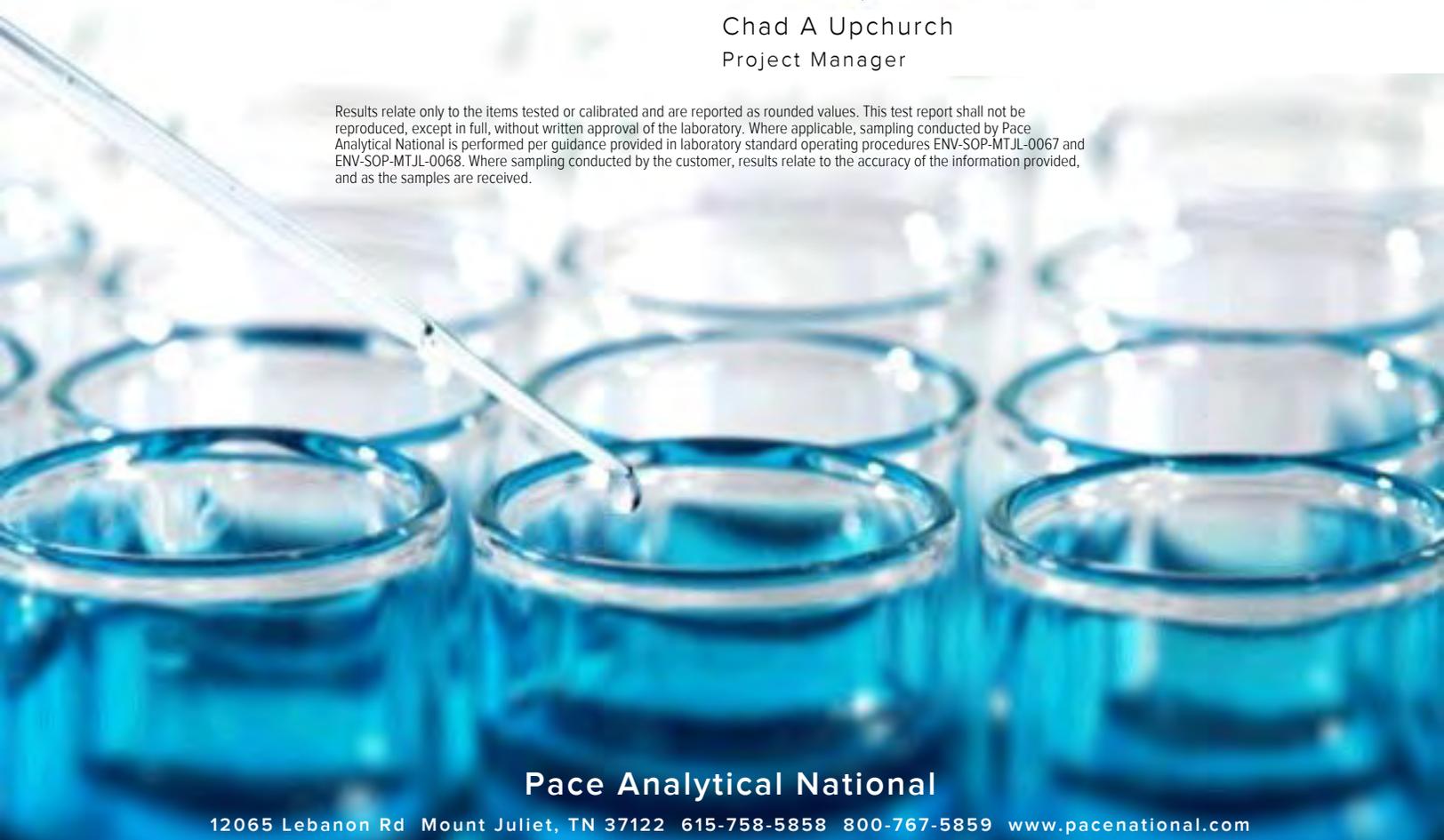
Sample Delivery Group: L1559966  
 Samples Received: 11/19/2022  
 Project Number:  
 Description: Maverick Vacuum Glorietta

Report To: Chuck Terhune  
 1500 CityWest Boulevard  
 Suite 1000  
 Houston, TX 77042

Entire Report Reviewed By:

Chad A Upchurch  
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

<b>Cp: Cover Page</b>	<b>1</b>	
<b>Tc: Table of Contents</b>	<b>2</b>	
<b>Ss: Sample Summary</b>	<b>3</b>	
<b>Cn: Case Narrative</b>	<b>4</b>	
<b>Sr: Sample Results</b>	<b>5</b>	
<b>VG-3 L1559966-01</b>	<b>5</b>	
<b>VG-6 L1559966-02</b>	<b>6</b>	
<b>VG-7 L1559966-03</b>	<b>7</b>	
<b>VG-5 L1559966-04</b>	<b>8</b>	
<b>DUP L1559966-05</b>	<b>9</b>	
<b>Qc: Quality Control Summary</b>	<b>10</b>	
<b>Wet Chemistry by Method 9056A</b>	<b>10</b>	
<b>Volatile Organic Compounds (GC/MS) by Method 8260B</b>	<b>11</b>	
<b>Gl: Glossary of Terms</b>	<b>12</b>	
<b>Al: Accreditations &amp; Locations</b>	<b>13</b>	
<b>Sc: Sample Chain of Custody</b>	<b>14</b>	

VG-3 L1559966-01 GW

Collected by  
MATTHEW  
CASTREJON  
Collected date/time  
11/15/22 12:00  
Received date/time  
11/19/22 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1965129	1	11/26/22 01:07	11/26/22 01:07	LBR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1965061	1	11/26/22 01:28	11/26/22 01:28	DWR	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

VG-6 L1559966-02 GW

Collected by  
MATTHEW  
CASTREJON  
Collected date/time  
11/15/22 13:50  
Received date/time  
11/19/22 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1965129	1	11/26/22 01:21	11/26/22 01:21	LBR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1965061	1	11/26/22 01:48	11/26/22 01:48	DWR	Mt. Juliet, TN

4 Cn

5 Sr

6 Qc

VG-7 L1559966-03 GW

Collected by  
MATTHEW  
CASTREJON  
Collected date/time  
11/15/22 15:15  
Received date/time  
11/19/22 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1965129	1	11/26/22 01:35	11/26/22 01:35	LBR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1965061	1	11/26/22 02:08	11/26/22 02:08	DWR	Mt. Juliet, TN

7 Gl

8 Al

9 Sc

VG-5 L1559966-04 GW

Collected by  
MATTHEW  
CASTREJON  
Collected date/time  
11/16/22 12:20  
Received date/time  
11/19/22 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1965129	10	11/26/22 01:48	11/26/22 01:48	LBR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1965061	1	11/26/22 02:27	11/26/22 02:27	DWR	Mt. Juliet, TN

DUP L1559966-05 GW

Collected by  
MATTHEW  
CASTREJON  
Collected date/time  
11/16/22 00:00  
Received date/time  
11/19/22 08:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9056A	WG1965129	1	11/26/22 02:02	11/26/22 02:02	LBR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1965061	1	11/26/22 02:47	11/26/22 02:47	DWR	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Chad A Upchurch  
Project Manager

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc

Collected date/time: 11/15/22 12:00

L1559966

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	mg/l		mg/l	mg/l		date / time	
Chloride	59.7		0.379	1.00	1	11/26/2022 01:07	<a href="#">WG1965129</a>

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.0000941	0.00100	1	11/26/2022 01:28	<a href="#">WG1965061</a>
Toluene	U		0.000278	0.00100	1	11/26/2022 01:28	<a href="#">WG1965061</a>
Ethylbenzene	U		0.000137	0.00100	1	11/26/2022 01:28	<a href="#">WG1965061</a>
Total Xylenes	U		0.000174	0.00300	1	11/26/2022 01:28	<a href="#">WG1965061</a>
(S) Toluene-d8	103			80.0-120		11/26/2022 01:28	<a href="#">WG1965061</a>
(S) 4-Bromofluorobenzene	102			77.0-126		11/26/2022 01:28	<a href="#">WG1965061</a>
(S) 1,2-Dichloroethane-d4	109			70.0-130		11/26/2022 01:28	<a href="#">WG1965061</a>

Collected date/time: 11/15/22 13:50

L1559966

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Chloride	126		0.379	1.00	1	11/26/2022 01:21	<a href="#">WG1965129</a>

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Benzene	U		0.0000941	0.00100	1	11/26/2022 01:48	<a href="#">WG1965061</a>
Toluene	U		0.000278	0.00100	1	11/26/2022 01:48	<a href="#">WG1965061</a>
Ethylbenzene	U		0.000137	0.00100	1	11/26/2022 01:48	<a href="#">WG1965061</a>
Total Xylenes	U		0.000174	0.00300	1	11/26/2022 01:48	<a href="#">WG1965061</a>
(S) Toluene-d8	103			80.0-120		11/26/2022 01:48	<a href="#">WG1965061</a>
(S) 4-Bromofluorobenzene	101			77.0-126		11/26/2022 01:48	<a href="#">WG1965061</a>
(S) 1,2-Dichloroethane-d4	108			70.0-130		11/26/2022 01:48	<a href="#">WG1965061</a>

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Collected date/time: 11/15/22 15:15

L1559966

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	mg/l		mg/l	mg/l		date / time	
Chloride	137		0.379	1.00	1	11/26/2022 01:35	<a href="#">WG1965129</a>

1 Cp

2 Tc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	mg/l		mg/l	mg/l		date / time	
Benzene	U		0.0000941	0.00100	1	11/26/2022 02:08	<a href="#">WG1965061</a>
Toluene	U		0.000278	0.00100	1	11/26/2022 02:08	<a href="#">WG1965061</a>
Ethylbenzene	U		0.000137	0.00100	1	11/26/2022 02:08	<a href="#">WG1965061</a>
Total Xylenes	U		0.000174	0.00300	1	11/26/2022 02:08	<a href="#">WG1965061</a>
(S) Toluene-d8	103			80.0-120		11/26/2022 02:08	<a href="#">WG1965061</a>
(S) 4-Bromofluorobenzene	104			77.0-126		11/26/2022 02:08	<a href="#">WG1965061</a>
(S) 1,2-Dichloroethane-d4	107			70.0-130		11/26/2022 02:08	<a href="#">WG1965061</a>

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Collected date/time: 11/16/22 12:20

L1559966

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Chloride	248		3.79	10.0	10	11/26/2022 01:48	<a href="#">WG1965129</a>

- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Benzene	U		0.0000941	0.00100	1	11/26/2022 02:27	<a href="#">WG1965061</a>
Toluene	U		0.000278	0.00100	1	11/26/2022 02:27	<a href="#">WG1965061</a>
Ethylbenzene	U		0.000137	0.00100	1	11/26/2022 02:27	<a href="#">WG1965061</a>
Total Xylenes	U		0.000174	0.00300	1	11/26/2022 02:27	<a href="#">WG1965061</a>
(S) Toluene-d8	99.1			80.0-120		11/26/2022 02:27	<a href="#">WG1965061</a>
(S) 4-Bromofluorobenzene	101			77.0-126		11/26/2022 02:27	<a href="#">WG1965061</a>
(S) 1,2-Dichloroethane-d4	111			70.0-130		11/26/2022 02:27	<a href="#">WG1965061</a>

Collected date/time: 11/16/22 00:00

L1559966

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Chloride	135		0.379	1.00	1	11/26/2022 02:02	<a href="#">WG1965129</a>

<sup>1</sup>Cp

<sup>2</sup>Tc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
Benzene	U		0.0000941	0.00100	1	11/26/2022 02:47	<a href="#">WG1965061</a>
Toluene	U		0.000278	0.00100	1	11/26/2022 02:47	<a href="#">WG1965061</a>
Ethylbenzene	U		0.000137	0.00100	1	11/26/2022 02:47	<a href="#">WG1965061</a>
Total Xylenes	U		0.000174	0.00300	1	11/26/2022 02:47	<a href="#">WG1965061</a>
(S) Toluene-d8	104			80.0-120		11/26/2022 02:47	<a href="#">WG1965061</a>
(S) 4-Bromofluorobenzene	95.8			77.0-126		11/26/2022 02:47	<a href="#">WG1965061</a>
(S) 1,2-Dichloroethane-d4	104			70.0-130		11/26/2022 02:47	<a href="#">WG1965061</a>

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

Wet Chemistry by Method 9056A

[L1559966-01,02,03,04,05](#)

Method Blank (MB)

(MB) R3865259-1 11/25/22 18:01

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
Chloride	U		0.379	1.00

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc

L1559304-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1559304-06 11/25/22 19:38 • (DUP) R3865259-3 11/25/22 19:52

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Chloride	U	U	1	0.000		15

L1559963-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1559963-02 11/25/22 22:23 • (DUP) R3865259-6 11/25/22 22:36

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Chloride	10.5	10.3	1	1.48		15

Laboratory Control Sample (LCS)

(LCS) R3865259-2 11/25/22 18:15

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Chloride	40.0	39.4	98.5	80.0-120	

L1559304-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1559304-06 11/25/22 19:38 • (MS) R3865259-4 11/25/22 20:06 • (MSD) R3865259-5 11/25/22 20:19

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Chloride	50.0	U	48.4	48.8	96.7	97.7	1	80.0-120			0.956	15

L1559963-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1559963-02 11/25/22 22:23 • (MS) R3865259-7 11/25/22 22:50

Analyte	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Chloride	50.0	10.5	57.8	94.6	1	80.0-120	

Volatile Organic Compounds (GC/MS) by Method 8260B

[L1559966-01,02,03,04,05](#)

Method Blank (MB)

(MB) R3866204-3 11/25/22 21:12

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.0000941	0.00100
Toluene	U		0.000278	0.00100
Ethylbenzene	U		0.000137	0.00100
Xylenes, Total	U		0.000174	0.00300
(S) Toluene-d8	98.9			80.0-120
(S) 4-Bromofluorobenzene	97.2			77.0-126
(S) 1,2-Dichloroethane-d4	105			70.0-130

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3866204-1 11/25/22 20:13 • (LCSD) R3866204-2 11/25/22 20:33

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.00500	0.00549	0.00553	110	111	70.0-123			0.726	20
Toluene	0.00500	0.00536	0.00570	107	114	79.0-120			6.15	20
Ethylbenzene	0.00500	0.00514	0.00532	103	106	79.0-123			3.44	20
Xylenes, Total	0.0150	0.0162	0.0163	108	109	79.0-123			0.615	20
(S) Toluene-d8				102	105	80.0-120				
(S) 4-Bromofluorobenzene				111	110	77.0-126				
(S) 1,2-Dichloroethane-d4				107	106	70.0-130				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.



Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey-NELAP	TN002
California	2932	New Mexico <sup>1</sup>	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina <sup>1</sup>	DW21704
Georgia	NELAP	North Carolina <sup>3</sup>	41
Georgia <sup>1</sup>	923	North Dakota	R-140
Idaho	TN00003	Ohio-VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky <sup>1,6</sup>	KY90010	South Carolina	84004002
Kentucky <sup>2</sup>	16	South Dakota	n/a
Louisiana	AI30792	Tennessee <sup>1,4</sup>	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas <sup>5</sup>	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA-Crypto	TN00003		



<sup>1</sup> Drinking Water <sup>2</sup> Underground Storage Tanks <sup>3</sup> Aquatic Toxicity <sup>4</sup> Chemical/Microbiological <sup>5</sup> Mold <sup>6</sup> Wastewater n/a Accreditation not applicable

\* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

\* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

Company Name/Address: <b>Tetra Tech EMI - Houston, TX</b> 1500 CityWest Boulevard Suite 1000 Houston, TX 77042		Billing Information: Accounts Payable 901 West Wall Suite 100 Midland, TX 79701		Pres Chk		Analysis / Container / Preservative										Chain of Custody Page <u>1</u> of <u>1</u>					
Report to: <b>Chuck Terhune</b>		Email To: chuck.terhune@tetratech.com;bill.smith2@tetra														 <b>MT JULIET, TN</b> 12065 Lebanon Rd. Mount Juliet, TN 37122 Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: <a href="https://info.pacelabs.com/hubs/pas-standard-terms.pdf">https://info.pacelabs.com/hubs/pas-standard-terms.pdf</a>					
Project Description: <b>Maverick Vacuum Glorietta</b>		City/State Collected:		Please Circle: PT MT CT ET																	
Phone: <b>832-251-5160</b>		Client Project #		Lab Project # <b>TETRAHTX-VACUUMGLORI</b>												SDG # <b>U559964</b> <b>F205</b>					
Collected by (print): <i>Matthew Castrejan</i>		Site/Facility ID #		P.O. # <b>212C-441-02008</b>												Acctnum: <b>TETRAHTX</b> Template: <b>T219041</b>					
Collected by (signature):		<b>Rush?</b> (Lab MUST Be Notified) ___ Same Day ___ Five Day ___ Next Day ___ 5 Day (Rad Only) ___ Two Day ___ 10 Day (Rad Only) ___ Three Day		Quote #												Prelogin: <b>P960464</b> PM: <b>3564 - Chad A Upchurch</b> PB:					
Immediately Packed on Ice N ___ Y <input checked="" type="checkbox"/>				Date Results Needed												Shipped Via:					
Sample ID		Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs											Remarks	Sample # (lab only)		
VG-3		G	GW		11/15/22	1200	4	X	X												-01
VG-6		G	GW		11/15/22	1350															-02
VG-7		G	GW		11/15/22	1515															-03
VG-5		G	GW		11/16/22	1220															-04
<del>VG-4</del>		<del>G</del>	<del>GW</del>		<del>11/16/22</del>	<del>1325</del>															-05
DUP		G	GW																		
			GW																		
			GW																		
			GW																		
* Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater DW - Drinking Water OT - Other _____		Remarks:		pH _____ Temp _____ Flow _____ Other _____												Sample Receipt Checklist COC Seal Present/Intact: <input checked="" type="checkbox"/> N P Y N COC Signed/Accurate: <input checked="" type="checkbox"/> N Bottles arrive intact: <input checked="" type="checkbox"/> N Correct bottles used: <input checked="" type="checkbox"/> N Sufficient volume sent: <input checked="" type="checkbox"/> N If Applicable VOA Zero Headspace: <input checked="" type="checkbox"/> N Preservation Correct/Checked: <input checked="" type="checkbox"/> Y N RAD Screen <0.5 mR/hr: <input checked="" type="checkbox"/> N					
Samples returned via: ___ UPS ___ FedEx ___ Courier _____		Tracking #																			
Relinquished by: (Signature) <i>Matthew Castrejan</i>		Date: <b>11-18-22</b>	Time: <b>4:00</b>	Received by: (Signature) <i>[Signature]</i>		Trip Blank Received: Yes / No HCL / MeOH TBR															
Relinquished by: (Signature) <i>[Signature]</i>		Date: <b>11-16-22</b>	Time: <b>1700</b>	Received by: (Signature) <i>[Signature]</i>		Temp: <b>NSA6 °C</b> Bottles Received: <b>5.7 + 0 = 5.7 20</b>												If preservation required by Login: Date/Time			
Relinquished by: (Signature)		Date:	Time:	Received for lab by: (Signature) <i>[Signature]</i>		Date: <b>11-19-22</b> Time: <b>0800</b>												Hold: Condition: <b>OK</b>			

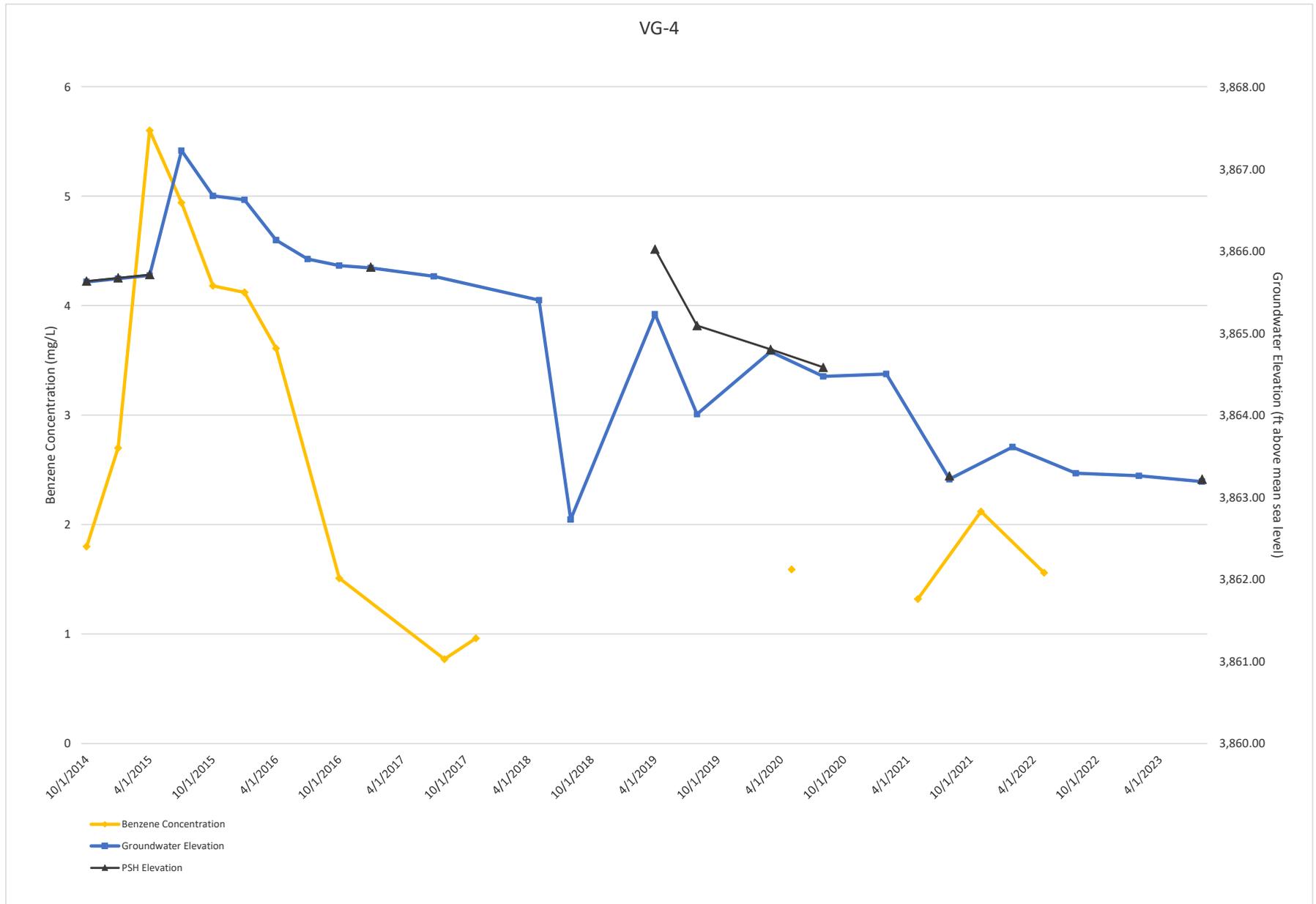
Vacuum Glorietta East Unit (1RP-744)  
Lea County, New Mexico

2022 Annual Report  
January 27, 2023

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## APPENDIX B: BENZENE CONCENTRATION GRAPHS

### Benzene Concentration Graph Maverick Natural Resources - Vacuum Glorietta Lea County, New Mexico



## APPENDIX C: HISTORICAL GROUNDWATER GAUGING DATA

**APPENDIX C**  
**Historical Groundwater Gauging Data**  
**VG-2**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Gauging Date	Well Total Depth (feet BTOC)	PSH (feet BTOC)	Water level (feet BTOC)	PSH Thickness (feet)	PSH Elevation (feet AMSL)	TOC Elevation (feet AMSL)	Groundwater Elevation (feet AMSL)
1/27/2014	70.00	-	65.41	-	-	3,930.56	<b>3,865.15</b>
4/16/2014	70.00	-	65.38	-	-	3,930.56	<b>3,865.18</b>
7/22/2014	70.00	-	65.32	-	-	3,930.56	<b>3,865.24</b>
10/9/2014	70.00	-	64.03	-	-	3,930.56	<b>3,866.53</b>
1/14/2015	70.00	-	64.30	-	-	3,930.56	<b>3,866.26</b>
4/16/2015	70.00	-	64.37	-	-	3,930.56	<b>3,866.19</b>
7/8/2015	70.00	-	64.85	-	-	3,930.56	<b>3,865.71</b>
10/9/2015	70.00	-	65.15	-	-	3,930.56	<b>3,865.41</b>
1/7/2016	70.00	-	65.25	-	-	3,930.56	<b>3,865.31</b>
4/6/2016	70.00	-	65.29	-	-	3,930.56	<b>3,865.27</b>
6/10/2016	70.00	-	65.35	-	-	3,930.56	<b>3,865.21</b>
8/16/2017	70.00	-	65.58	-	-	3,930.56	<b>3,864.98</b>
11/30/2017	70.00	-	65.57	-	-	3,930.56	<b>3,864.99</b>
7/24/2018	-	-	65.79	-	-	3,930.56	<b>3,864.77</b>
11/14/2018	67.70	-	65.90	-	-	3,930.56	<b>3,864.66</b>
6/17/2019	67.89	-	66.44	-	-	3,930.56	<b>3,864.12</b>
11/20/2019	67.89	-	66.42	-	-	3,930.56	<b>3,864.14</b>
5/13/2020	67.7	-	66.51	-	-	3,930.56	<b>3,864.05</b>
11/19/2020	67.7	-	66.74	-	-	3,930.56	<b>3,863.82</b>
5/11/2021	67.7	-	Dry	-	-	3,930.56	<b>Dry</b>
11/17/2021	67.7	-	Dry	-	-	3,930.56	<b>Dry</b>
5/23/2022	67.7	-	Dry	-	-	3,930.56	<b>Dry</b>
11/14/2022	67.7	-	Dry	-	-	3,930.56	<b>Dry</b>

Notes:

- TOC      Top of Casing
- AMSL    Above Mean Sea Level
- BTOC    Below Top of Casing

**APPENDIX C**  
**Historical Groundwater Gauging Data**  
**VG-3**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Gauging Date	Well Total Depth (feet BTOC)	PSH (feet BTOC)	Water level (feet BTOC)	PSH Thickness (feet)	PSH Elevation (feet AMSL)	TOC Elevation (feet AMSL)	Groundwater Elevation (feet AMSL)
1/27/2014	70.00	-	64.71	-	-	3,931.15	3,866.44
4/16/2014	70.00	-	64.66	-	-	3,931.15	3,866.49
7/22/2014	70.00	-	64.59	-	-	3,931.15	3,866.56
9/10/2014	70.00	-	63.30	-	-	3,931.15	3,867.85
1/14/2015	70.00	-	63.58	-	-	3,931.15	3,867.57
4/16/2015	70.00	-	63.63	-	-	3,931.15	3,867.52
8/7/2015	70.00	-	64.11	-	-	3,931.15	3,867.04
9/10/2015	70.00	-	64.38	-	-	3,931.15	3,866.77
7/1/2016	70.00	-	64.48	-	-	3,931.15	3,866.67
6/4/2016	70.00	-	64.54	-	-	3,931.15	3,866.61
6/10/2016	70.00	-	64.61	-	-	3,931.15	3,866.54
8/16/2017	70.00	-	64.86	-	-	3,931.15	3,866.29
11/30/2017	70.00	-	64.87	-	-	3,931.15	3,866.28
7/24/2018	-	-	65.02	-	-	3,931.15	3,866.13
11/14/2018	68.48	-	65.21	-	-	3,931.15	3,865.94
6/17/2019	68.61	-	65.56	-	-	3,931.15	3,865.59
11/19/2019	68.61	-	65.66	-	-	3,931.15	3,865.49
5/12/2020	68.3	-	65.78	-	-	3,931.15	3,865.37
11/19/2020	68.3	-	65.98	-	-	3,931.15	3,865.17
5/11/2021	68.41	-	66.59	-	-	3,931.15	3,864.56
11/17/2021	68.41	-	67.23	-	-	3,931.15	3,863.92
5/23/2022	68.41	-	67.06	-	-	3,931.15	3,864.09
11/14/2022	68.41	-	67.13	-	-	3,931.15	3,864.02

Notes:

- TOC      Top of Casing
- AMSL    Above Mean Sea Level
- BTOC    Below Top of Casing

**APPENDIX C**  
**Historical Groundwater Gauging Data**  
**VG-4**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Gauging Date	Well Total Depth (feet BTOC)	PSH (feet BTOC)	Water level (feet BTOC)	PSH Thickness (feet)	PSH Elevation (feet AMSL)	TOC Elevation (feet AMSL)	Corrected Groundwater Elevation (feet AMSL)
1/27/2014	78.00	65.52	65.56	0.04	3,865.63	3,931.15	<b>3,865.62</b>
4/16/2014	78.00	65.48	65.49	0.01	3,865.67	3,931.15	<b>3,865.66</b>
7/22/2014	78.00	65.44	65.45	0.01	3,865.71	3,931.15	<b>3,865.70</b>
10/9/2014	78.00	-	63.93	0	-	3,931.15	<b>3,867.22</b>
1/14/2015	78.00	-	64.48	0	-	3,931.15	<b>3,866.67</b>
4/16/2015	78.00	-	64.53	0	-	3,931.15	<b>3,866.62</b>
7/8/2015	78.00	-	65.02	0	-	3,931.15	<b>3,866.13</b>
10/9/2015	78.00	-	65.25	0	-	3,931.15	<b>3,865.90</b>
1/7/2016	78.00	-	65.33	0	-	3,931.15	<b>3,865.82</b>
4/6/2016	78.00	65.35	65.36	0.01	3,865.80	3,931.15	<b>3,865.79</b>
10/6/2016	78.00	-	65.46	0	-	3,931.15	<b>3,865.69</b>
8/16/2017	78.00	-	65.75	0	-	3,931.15	<b>3,865.40</b>
11/30/2017	78.00	-	68.42	0	-	3,931.15	<b>3,862.73</b>
7/24/2018	-	65.13	65.92	0.79	3,866.02	3,931.15	<b>3,865.23</b>
11/14/2018	-	66.06	67.14	1.08	3,865.09	3,931.15	<b>3,864.01</b>
6/17/2019	-	66.35	66.38	0.03	3,864.80	3,931.15	<b>3,864.77</b>
11/19/2019	-	66.57	66.68	0.11	3,864.58	3,931.15	<b>3,864.47</b>
5/13/2020	72.1	-	66.65	0	-	3,931.15	<b>3,864.50</b>
11/18/2020	-	67.89	67.93	0.04	3,863.26	3,931.15	<b>3,863.22</b>
5/12/2021	70.7	-	67.54	0	-	3,931.15	<b>3,863.61</b>
11/17/2021	70.7	-	67.86	0	-	3,931.15	<b>3,863.29</b>
5/23/2022	70.7	-	67.89	0	-	3,931.15	<b>3,863.26</b>
11/14/2022	70.7	67.93	67.96	0.03	3,863.22	3,931.15	<b>3,863.19</b>

**Notes:**

- TOC Top of Casing
- AMSL Above Mean Sea Level
- BTOC Below Top of Casing

**APPENDIX C**  
**Historical Groundwater Gauging Data**  
**VG-5**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Gauging Date	Well Total Depth (feet BTOC)	PSH (feet BTOC)	Water level (feet BTOC)	PSH Thickness (feet)	PSH Elevation (feet AMSL)	TOC Elevation (feet AMSL)	Groundwater Elevation (feet AMSL)
1/27/2014	74.00	-	64.51	-	-	3,930.52	<b>3,866.01</b>
4/16/2014	74.00	-	64.80	-	-	3,930.52	<b>3,865.72</b>
7/22/2014	74.00	-	64.38	-	-	3,930.52	<b>3,866.14</b>
10/9/2014	74.00	-	63.16	-	-	3,930.52	<b>3,867.36</b>
1/14/2015	74.00	-	63.42	-	-	3,930.52	<b>3,867.10</b>
4/16/2015	74.00	-	63.46	-	-	3,930.52	<b>3,867.06</b>
7/8/2015	74.00	-	63.99	-	-	3,930.52	<b>3,866.53</b>
10/9/2015	74.00	-	64.25	-	-	3,930.52	<b>3,866.27</b>
1/7/2016	74.00	-	64.32	-	-	3,930.52	<b>3,866.20</b>
4/6/2016	74.00	-	64.36	-	-	3,930.52	<b>3,866.16</b>
10/6/2016	74.00	-	64.43	-	-	3,930.52	<b>3,866.09</b>
8/16/2017	74.00	-	64.68	-	-	3,930.52	<b>3,865.84</b>
11/30/2017	74.00	-	64.77	-	-	3,930.52	<b>3,865.75</b>
7/24/2018	-	-	64.84	-	-	3,930.52	<b>3,865.68</b>
11/14/2018	75.30	-	64.98	-	-	3,930.52	<b>3,865.54</b>
6/17/2019	75.31	-	65.46	-	-	3,930.52	<b>3,865.06</b>
11/20/2019	75.31	-	65.49	-	-	3,930.52	<b>3,865.03</b>
5/13/2020	75.15	-	65.57	-	-	3,930.52	<b>3,864.95</b>
11/19/2020	75.15	-	65.80	-	-	3,930.52	<b>3,864.72</b>
5/11/2021	75.15	-	66.49	-	-	3,930.52	<b>3,864.03</b>
11/17/2021	75.15	-	66.81	-	-	3,930.52	<b>3,863.71</b>
5/23/2022	75.15	-	66.90	-	-	3,930.52	<b>3,863.62</b>
11/14/2022	75.15	-	66.97	-	-	3,930.52	<b>3,863.55</b>

Notes:

- TOC      Top of Casing
- AMSL    Above Mean Sea Level
- BTOC    Below Top of Casing

**APPENDIX C**  
**Historical Groundwater Gauging Data**  
**VG-6**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Gauging Date	Well Total Depth (feet BTOC)	PSH (feet BTOC)	Water level (feet BTOC)	PSH Thickness (feet)	PSH Elevation (feet AMSL)	TOC Elevation (feet AMSL)	Groundwater Elevation (feet AMSL)
1/27/2014	80.00	-	68.38	-	-	3,935.16	<b>3,866.78</b>
4/16/2014	80.00	-	68.32	-	-	3,935.16	<b>3,866.84</b>
7/22/2014	80.00	-	68.26	-	-	3,935.16	<b>3,866.90</b>
10/9/2014	80.00	-	67.06	-	-	3,935.16	<b>3,868.10</b>
1/14/2015	80.00	-	67.27	-	-	3,935.16	<b>3,867.89</b>
4/16/2015	80.00	-	67.30	-	-	3,935.16	<b>3,867.86</b>
7/8/2015	80.00	-	67.86	-	-	3,935.16	<b>3,867.30</b>
10/9/2015	80.00	-	68.12	-	-	3,935.16	<b>3,867.04</b>
1/7/2016	80.00	-	68.16	-	-	3,935.16	<b>3,867.00</b>
4/6/2016	80.00	-	68.21	-	-	3,935.16	<b>3,866.95</b>
10/6/2016	80.00	-	68.27	-	-	3,935.16	<b>3,866.89</b>
8/16/2017	80.00	-	68.53	-	-	3,935.16	<b>3,866.63</b>
11/30/2017	80.00	-	68.57	-	-	3,935.16	<b>3,866.59</b>
7/24/2018	-	-	68.69	-	-	3,935.16	<b>3,866.47</b>
11/14/2018	80.00	-	68.86	-	-	3,935.16	<b>3,866.30</b>
6/17/2019	80.16	-	69.35	-	-	3,935.16	<b>3,865.81</b>
11/19/2019	80.16	-	69.31	-	-	3,935.16	<b>3,865.85</b>
5/12/2020	79.72	-	69.41	-	-	3,935.16	<b>3,865.75</b>
11/18/2020	79.72	-	69.64	-	-	3,935.16	<b>3,865.52</b>
5/12/2021	79.72	-	70.48	-	-	3,935.16	<b>3,864.68</b>
11/17/2021	79.72	-	70.73	-	-	3,935.16	<b>3,864.43</b>
5/23/2022	79.72	-	70.80	-	-	3,935.16	<b>3,864.36</b>
11/14/2022	79.72	-	70.65	-	-	3,935.16	<b>3,864.51</b>

Notes:

- TOC      Top of Casing
- AMSL    Above Mean Sea Level
- BTOC    Below Top of Casing

**APPENDIX C**  
**Historical Groundwater Gauging Data**  
**VG-7**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Gauging Date	Well Total Depth (feet BTOC)	PSH (feet BTOC)	Water level (feet BTOC)	PSH Thickness (feet)	PSH Elevation (feet AMSL)	TOC Elevation (feet AMSL)	Groundwater Elevation (feet AMSL)
1/27/2014	80.00	-	68.23	-	-	3,934.78	3,866.55
4/16/2014	80.00	-	68.19	-	-	3,934.78	3,866.59
7/22/2014	80.00	-	68.10	-	-	3,934.78	3,866.68
10/9/2014	80.00	-	66.93	-	-	3,934.78	3,867.85
1/14/2015	80.00	-	67.12	-	-	3,934.78	3,867.66
4/16/2015	80.00	-	67.16	-	-	3,934.78	3,867.62
7/8/2015	80.00	-	67.70	-	-	3,934.78	3,867.08
10/9/2015	80.00	-	67.98	-	-	3,934.78	3,866.80
1/7/2016	80.00	-	68.01	-	-	3,934.78	3,866.77
4/6/2016	80.00	-	68.07	-	-	3,934.78	3,866.71
10/6/2016	80.00	-	68.13	-	-	3,934.78	3,866.65
8/16/2017	80.00	-	68.38	-	-	3,934.78	3,866.40
11/30/2017	80.00	-	68.36	-	-	3,934.78	3,866.42
7/24/2018	-	-	68.58	-	-	3,934.78	3,866.20
11/14/2018	79.80	-	68.65	-	-	3,934.78	3,866.13
6/17/2019	80.09	-	69.15	-	-	3,934.78	3,865.63
11/19/2019	80.09	-	69.17	-	-	3,934.78	3,865.61
5/12/2020	79.87	-	69.30	-	-	3,934.78	3,865.48
11/18/2020	79.86	-	69.48	-	-	3,934.78	3,865.30
5/12/2021	79.86	-	70.36	-	-	3,934.78	3,864.42
11/17/2021	79.86	-	70.77	-	-	3,934.78	3,864.01
5/23/2022	79.86	-	70.52	-	-	3,934.78	3,864.26
11/14/2022	79.86	-	70.60	-	-	3,934.78	3,864.18

Notes:

- TOC      Top of Casing
- AMSL    Above Mean Sea Level
- BTOC    Below Top of Casing

**APPENDIX D: HISTORICAL GROUNDWATER ANALYTICAL DATA**

**APPENDIX D**  
**Historical Groundwater Analytical Data**  
**VG-2**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Chloride (mg/L)
<b>NMWQCC GQS</b>	<b>0.01</b>	<b>0.75</b>	<b>0.75</b>	<b>0.62</b>	<b>250</b>
1/28/2014	<0.001	<0.001	<0.001	<0.003	125
4/16/2014	<0.001	<0.001	<0.001	<0.003	134
7/22/2014	<0.001	<0.001	<0.001	<0.003	146
10/9/2014	<0.001	<0.001	<0.001	<0.003	111
1/14/2015	<0.001	<0.001	<0.001	<0.003	106
4/16/2015	<0.001	<0.001	<0.001	<0.003	88.4
7/8/2015	<0.001	<0.001	<0.001	<0.003	73.8
10/9/2015	<0.001	<0.001	<0.001	<0.003	106
1/7/2016	<0.001	<0.001	<0.001	<0.003	183
4/6/2016	<0.001	<0.001	<0.001	<0.003	174
10/6/2016	<0.001	<0.001	<0.001	<0.003	200
8/16/2017	<0.0020	<0.0050	<0.0020	<0.0060	200
11/30/2017	<0.0020	<0.0050	<0.0020	<0.0060	195
7/25/2018	<0.00100	<0.00100	<0.00100	<0.00300	173
11/14/2018	<0.00100	<0.00100	<0.00100	<0.00300	175
6/17/2019	<0.00100	<0.00100	<0.00100	<0.00300	193
11/20/2019	<0.00100	<0.00100	<0.00100	<0.00300	192
5/13/2020	<0.00100	<0.00100	<0.00100	<0.00300	176
11/19/2020	<0.00100	<0.00100	<0.00100	<0.00300	117
5/11/2021	Not Sampled - Dry				
11/17/2021	Not Sampled - Dry				
5/23/2022	Not Sampled - Dry				
11/14/2022	Not Sampled - Dry				

**Notes:**

- NMWQCC New Mexico Water Quality Control Commission
- GQS Groundwater Quality Standards
- J The identification of the analyte is acceptable; the reported value is an estimate
- Not Analyzed
- Result exceeds NMWQCC Groundwater Quality Standards

**APPENDIX D**  
**Historical Groundwater Analytical Data**  
**VG-3**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Chloride (mg/L)
<b>NMWQCC GQS</b>	<b>0.01</b>	<b>0.75</b>	<b>0.75</b>	<b>0.62</b>	<b>250</b>
1/18/2014	<0.001	<0.001	<0.001	<0.003	45.2
4/16/2014	<0.001	<0.001	<0.001	<0.003	46.7
7/22/2014	<0.001	<0.001	<0.001	<0.003	44.4
9/10/2014	<0.001	<0.001	<0.001	<0.003	38.2
1/14/2015	<0.001	<0.001	<0.001	<0.003	50
4/16/2015	<0.001	<0.001	<0.001	<0.003	45.7
7/8/2015	<0.001	<0.001	<0.001	<0.003	44.2
10/9/2015	<0.001	<0.001	<0.001	<0.003	41.6
1/7/2016	<0.001	<0.001	<0.001	<0.003	40.4
4/6/2016	<0.001	<0.001	<0.001	<0.003	40.9
10/6/2016	<0.001	<0.001	<0.001	<0.003	40.3
8/16/2017	<0.0020	<0.0050	<0.0020	<0.0060	40.4
11/30/2017	<0.0020	<0.0050	<0.0020	<0.0060	38.1
7/25/2018	<0.00100	<0.00100	<0.00100	<0.00300	44.8
11/14/2018	<0.00100	<0.00100	<0.00100	<0.00300	46.6
6/17/2019	<0.00100	<0.00100	<0.00100	<0.00300	49.6
11/19/2019	<0.00100	<0.00100	<0.00100	<0.00300	55.1
5/12/2020	<0.00100	<0.00100	<0.00100	<0.00300	56.8
11/19/2020	<0.00100	<0.00100	<0.00100	<0.00300	59.8
5/11/2021	0.000254 J	<0.00100	0.000335 J	0.000705 J	58.9
11/17/2021	<0.0020	<0.0050	<0.0020	<0.0060	51.7
5/23/2022	<0.0020	<0.0050	<0.0020	<0.0060	76.2
11/15/2022	<0.00100	<0.00100	<0.00100	<0.00300	59.7

**Notes:**

- NMWQCC New Mexico Water Quality Control Commission
- GQS Groundwater Quality Standards
- J The identification of the analyte is acceptable; the reported value is an estimate
- Not Analyzed
- Result exceeds NMWQCC Groundwater Quality Standards

**APPENDIX D**  
**Historical Groundwater Analytical Data**  
**VG-4**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Chloride (mg/L)
<b>NMWQCC GQS</b>	<b>0.01</b>	<b>0.75</b>	<b>0.75</b>	<b>0.62</b>	<b>250</b>
10/28/2014	1.8	<0.05	0.82	0.2	4,140
1/14/2015	2.7	0.03	1.1	0.78	5,640
4/16/2015	5.6	0.037	1.7	0.8	3,080
7/8/2015	4.94	<0.05	1.57	<0.15	2,240
10/9/2015	4.18	<0.05	1.5	0.305	1,480
1/7/2016	4.12	<0.05	2.1	0.272	1,360
4/6/2016	3.61	<0.05	5.47	2.13	1,190
10/6/2016	1.51	<0.05	0.54	0.256	1,490
8/16/2017	0.77	<0.0050	0.12	0.035	1,180
11/30/2017	0.96	0.0065	0.25	0.11	1,060
7/25/2018	Not Sampled - PSH Present				
11/14/2018	Not Sampled - PSH Present				
6/17/2019	Not Sampled - PSH Present				
11/19/2019	Not Sampled - PSH Present				
5/13/2020	1.59	0.0837	0.551	0.826	581
11/18/2020	Not Sampled - PSH Present				
5/12/2021	1.32	0.0246 J	0.296	0.111 J	532
11/18/2021	2.12	0.0463	0.0911	0.952	461
5/23/2022	1.56	0.0135	0.671	0.397	376
11/15/2022	Not Sampled - PSH Present				

**Notes:**

- NMWQCC New Mexico Water Quality Control Commission
- GQS Groundwater Quality Standards
- J The identification of the analyte is acceptable; the reported value is an estimate
- Not Analyzed
- Result exceeds NMWQCC Groundwater Quality Standards

**Historical Groundwater Analytical Data**  
**VG-5**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Chloride (mg/L)
<b>NMWQCC GQS</b>	<b>0.01</b>	<b>0.75</b>	<b>0.75</b>	<b>0.62</b>	<b>250</b>
1/28/2014	<0.001	<0.001	<0.001	<0.003	304
4/16/2014	<0.001	<0.001	<0.001	<0.003	342
7/22/2014	<0.001	<0.001	<0.001	<0.003	140
10/9/2014	<0.001	<0.001	<0.001	<0.003	278
1/14/2015	<0.001	<0.001	<0.001	<0.003	228
4/16/2015	<0.001	<0.001	<0.001	<0.003	200
7/8/2015	<0.001	<0.001	<0.001	<0.003	232
10/9/2015	<0.001	<0.001	<0.001	<0.003	204
1/7/2016	<0.001	<0.001	<0.001	<0.003	158
4/6/2016	<0.001	<0.001	<0.001	<0.003	224
10/6/2016	<0.001	<0.001	<0.001	<0.003	283
8/16/2017	<0.0020	<0.0050	<0.0020	<0.0060	298
11/30/2017	<0.0020	<0.0050	<0.0020	<0.0060	417
7/25/2018	<0.00100	<0.00100	<0.00100	<0.00300	225
11/14/2018	<0.00100	<0.00100	<0.00100	<0.00300	180
6/17/2019	0.000862 J	0.00439	0.000526 J	0.00244 J	188
11/20/2019	<0.00100	<0.00100	<0.00100	<0.00300	176
5/13/2020	<0.00100	<0.00100	<0.00100	<0.00300	295
11/19/2020	<0.00100	<0.00100	<0.00100	<0.00300	368
5/11/2021	0.000166 J	<0.00100	<0.00100	<0.00300	154
11/18/2021	<0.00200	<0.00500	<.00200	<0.00600	331
5/23/2022	<0.00200	<0.00500	<.00200	<0.00600	204
11/16/2022	<0.00100	<0.00100	<0.00100	<0.00300	248

**Notes:**

NMWQCC	New Mexico Water Quality Control Commission
GQS	Groundwater Quality Standards
J	The identification of the analyte is acceptable; the reported value is an estimate
-	Not Analyzed
	Result exceeds NMWQCC Groundwater Quality Standards

**APPENDIX D**  
**Historical Groundwater Analytical Data**  
**VG-6**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Chloride (mg/L)
<b>NMWQCC GQS</b>	<b>0.01</b>	<b>0.75</b>	<b>0.75</b>	<b>0.62</b>	<b>250</b>
1/28/2014	<0.001	<0.001	<0.001	<0.003	88.3
4/16/2014	<0.001	<0.001	<0.001	<0.003	78.1
7/22/2014	<0.001	<0.001	<0.001	<0.003	95.3
10/9/2014	<0.001	<0.001	<0.001	<0.003	113
1/14/2015	<0.001	<0.001	<0.001	<0.003	88.4
4/16/2015	<0.001	<0.001	<0.001	<0.003	82.3
7/8/2015	<0.001	<0.001	<0.001	<0.003	99.9
10/9/2015	<0.001	<0.001	<0.001	<0.003	134
1/7/2016	<0.001	<0.001	<0.001	<0.003	111
4/6/2016	<0.001	<0.001	<0.001	<0.003	86
10/6/2016	<0.001	<0.001	<0.001	<0.003	139
8/16/2017	<0.0020	<0.0050	<0.0020	<0.0060	140
11/30/2017	<0.0020	<0.0050	<0.0020	<0.0060	84.4
7/25/2018	<0.00100	<0.00100	<0.00100	<0.00300	117
11/14/2018	<0.00100	<0.00100	<0.00100	<0.00300	134
6/17/2019	<0.00100	0.00105	<0.00100	<0.00300	138
11/19/2019	<0.00100	<0.00100	<0.00100	<0.00300	143
5/12/2020	<0.00100	<0.00100	<0.00100	<0.00300	135
11/18/2020	<0.00100	<0.00100	<0.00100	<0.00300	115
5/12/2021	<0.00100	<0.00100	<0.00100	<0.00300	88.8
11/17/2021	<0.0020	<0.0050	<0.0020	<0.0060	75.1
5/23/2022	<0.0020	<0.0050	<0.0020	<0.0060	64.1
11/15/2022	<0.00100	<0.00100	<0.00100	<0.00300	126

**Notes:**

NMWQCC	New Mexico Water Quality Control Commission
GQS	Groundwater Quality Standards
J	The identification of the analyte is acceptable; the reported value is an estimate
-	Not Analyzed
	Result exceeds NMWQCC Groundwater Quality Standards

**APPENDIX D**  
**Historical Groundwater Analytical Data**  
**VG-7**  
**Vacuum Glorietta**  
**Lea County, New Mexico**

Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Chloride (mg/L)
<b>NMWQCC GQS</b>	<b>0.01</b>	<b>0.75</b>	<b>0.75</b>	<b>0.62</b>	<b>250</b>
1/28/2014	<0.001	<0.001	<0.001	<0.003	191
4/16/2014	<0.001	<0.001	<0.001	<0.003	211
7/22/2014	<0.001	<0.001	<0.001	<0.003	201
10/9/2014	<0.001	<0.001	<0.001	<0.003	189
1/14/2015	<0.001	<0.001	<0.001	<0.003	246
4/16/2015	<0.001	<0.001	<0.001	<0.003	270
7/8/2015	<0.001	<0.001	<0.001	<0.003	203
10/9/2015	<0.001	<0.001	<0.001	<0.003	154
1/7/2016	<0.001	<0.001	<0.001	<0.003	121
4/6/2016	<0.001	<0.001	<0.001	<0.003	148
10/6/2016	<0.001	<0.001	<0.001	<0.003	172
8/16/2017	<0.0020	<0.0050	<0.0020	<0.0060	134
11/30/2017	<0.0020	<0.0050	<0.0020	<0.0060	164
7/25/2018	<0.00100	<0.00100	<0.00100	<0.00300	254
11/14/2018	<0.00100	<0.00100	<0.00100	<0.00300	229
6/17/2019	<0.00100	<0.00100	<0.00100	<0.00300	207
11/19/2019	<0.00100	<0.00100	<0.00100	<0.00300	149
5/12/2020	<0.00100	<0.00100	<0.00100	<0.00300	129
11/18/2020	<0.00100	<0.00100	<0.00100	<0.00300	122
5/12/2021	<0.00100	<0.00100	<0.00100	<0.00300	127
11/17/2021	<0.0020	<0.0050	<0.0020	<0.0060	137
5/23/2022	<0.0020	<0.0050	<0.0020	<0.0060	124
11/15/2022	<0.00100	<0.00100	<0.00100	<0.00300	137

**Notes:**

NMWQCC	New Mexico Water Quality Control Commission
GQS	Groundwater Quality Standards
J	The identification of the analyte is acceptable; the reported value is an estimate
-	Not Analyzed
	Result exceeds NMWQCC Groundwater Quality Standards

## APPENDIX E: ACUVAC REMEDIATION REPORTS



February 17, 2022

Ms. Julie Evans  
 Hydrogeologist/Environmental Project Manager  
 Tetra Tech  
 1500 City West Boulevard, Suite 1000  
 Houston, TX 77042

Dear Julie:

Re: Vacuum Glorietta Site, Lea County, NM, (Event #9)

At your request, AcuVac Remediation, LLC (AcuVac) performed five Soil Vapor Extraction (SVE) Events: #9A, #9B, #9C, #9D and #9E as outlined in the table below at the above referenced site (Site). The following is the report and a copy of the operating data collected during Event #9. Additionally, the attached Table #1 contains the Summary Well Data, and Table #2 contains the Summary Recovery Data.

Event Number	Well Number	Event Type	Event Duration (hrs)	Date
#9A	VG-4	SVE	16.0	02/07/2022
#9B	VG-4	SVE	24.0	02/08/2022
#9C	VG-4	SVE	24.0	02/09/2022
#9D	VG-4	SVE	24.0	02/10/2022
#9E	VG-4	SVE	12.0	02/11/2022

Event hours were calculated for each calendar day. For example, run time for Event #9A was based on the start time of 0800 hours until midnight on February 7, 2022. Events #9B, #9C and #9D were recorded on a 24-hour day. Event #9E run time started at midnight on February 10, 2022, and ended at 1200 hours on February 11, 2022.

The purpose of the events was to enhance recovery of phase separated hydrocarbons (PSH) present at the Site through the removal of petroleum hydrocarbons in both liquid and vapor phases. PSH refers to both petroleum hydrocarbons and Non-Aqueous Phase Liquids (NAPL). The source of the PSH is a historical pipeline release.

## OBJECTIVES

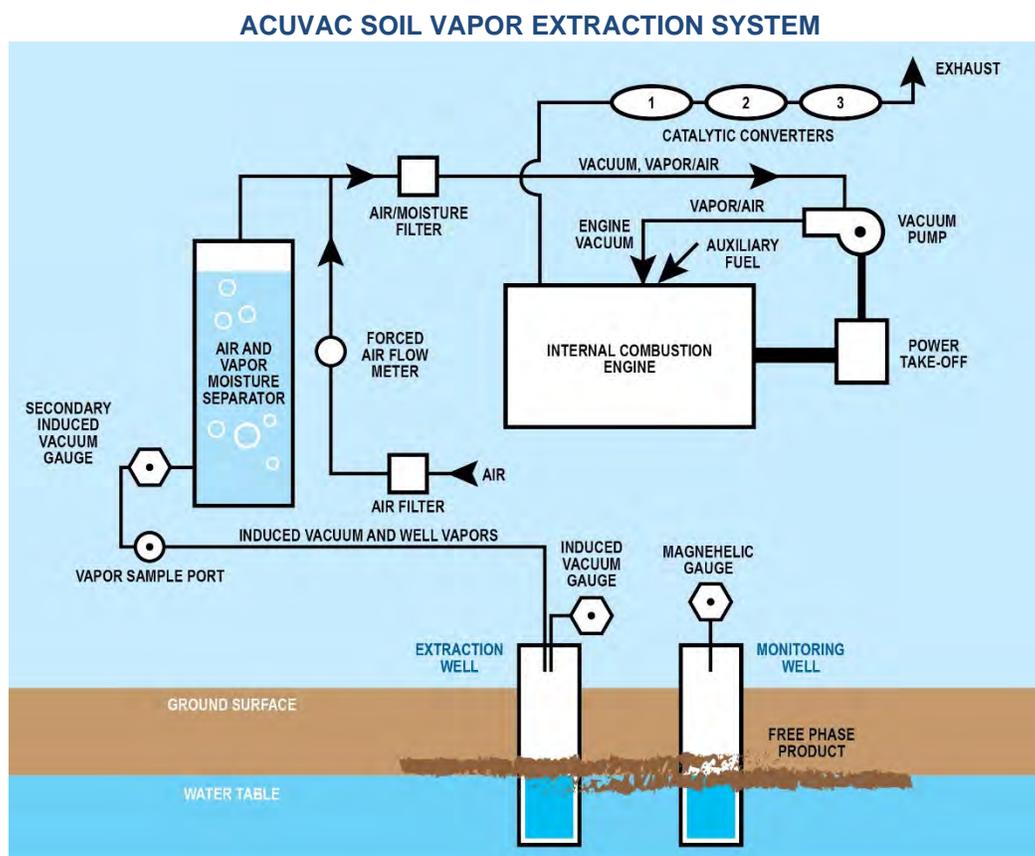
The objectives of the SVE Events:

- Maximize liquid and vapor phase petroleum hydrocarbon removal from groundwater and soils in the subsurface formations within the influence of the extraction well.
- Expose the capillary fringe area and below to the extraction well induced vacuums.
- Increase the liquid and vapor phase petroleum hydrocarbon specific yields with high induced vacuums.

### METHODS AND EQUIPMENT

AcuVac owns and maintains an inventory of equipment to perform SVE events and uses no third-party equipment. The events at the Site were conducted using the AcuVac I-6 System (System) with a Roots RAI-33 blower, used as a vacuum pump, and a Roots RAI-22 positive displacement blower. The table below lists additional equipment and instrumentation employed, and the data element captured by each.

Equipment and Instrumentation Employed by AcuVac	
Measurement Equipment	Data Element
<b>Extraction Well Induced Vacuum and Flow</b>	
Dwyer Magnehelic Gauges	Extraction Well Vacuum
Dwyer Averaging Pitot Tubes / Magnehelic Gauges	Extraction Well Vapor Flow
<b>Observation Wells</b>	
Dwyer Digital Manometer	Vacuum / Pressure Influence
<b>Extraction Well Vapor Monitoring</b>	
V-1 Vacuum Box	Extraction Well Non-Diluted Vapor Sample Collection
HORIBA® Analyzer	Extraction Well Vapor TPH Concentration
RKI 1200 O <sub>2</sub> Monitor	Extraction Well Vapor Oxygen Content
<b>NAPL Thickness (if present)</b>	
Solinst Interface Probes Model 122	Depth to LNAPL and Depth to Groundwater
<b>Atmospheric Conditions</b>	
Testo Model 511	Relative and Absolute Barometric Pressure



The vacuum extraction portion of the System consists of a vacuum pump driven by an internal combustion engine (IC engine). The vacuum pump connects to the extraction well, and the vacuum created on the extraction well causes light hydrocarbons in the soil and in the groundwater to volatilize and flow through a moisture knockout tank to the vacuum pump and the IC engine where they burn as part of the normal combustion process. Auxiliary propane powers the engine if the well vapors do not provide the required energy.

The IC engine provides the power necessary to achieve and maintain high induced vacuums and/or high well vapor flows needed to maximize the vacuum radius of influence.

Emissions from the engine pass through three catalytic converters to maximize destruction of effluent hydrocarbon vapors. The engine’s fuel-to-air ratio is adjusted to maintain efficient combustion. Because the engine powers all equipment, the System stops when the engine stops preventing an uncontrolled release of hydrocarbons. Since the System operates entirely under vacuum, any leaks in the seals or connections leak into the System and not the atmosphere. Vacuum loss, low oil pressure, over-speed, or overheating automatically shut down the engine. The design of the AcuVac System enables independent control of both the induced well vacuum and the groundwater pumping functions such that the AcuVac team controls the induced hydraulic gradient to increase exposure of the formation to soil vapor extraction (SVE). The ability to separate the vapor and liquid flows within the extraction well improve the LNAPL recovery rates and enabled the AcuVac team to record data specific to each media.

**RECOVERY SUMMARY FOR SVE EVENT #9**

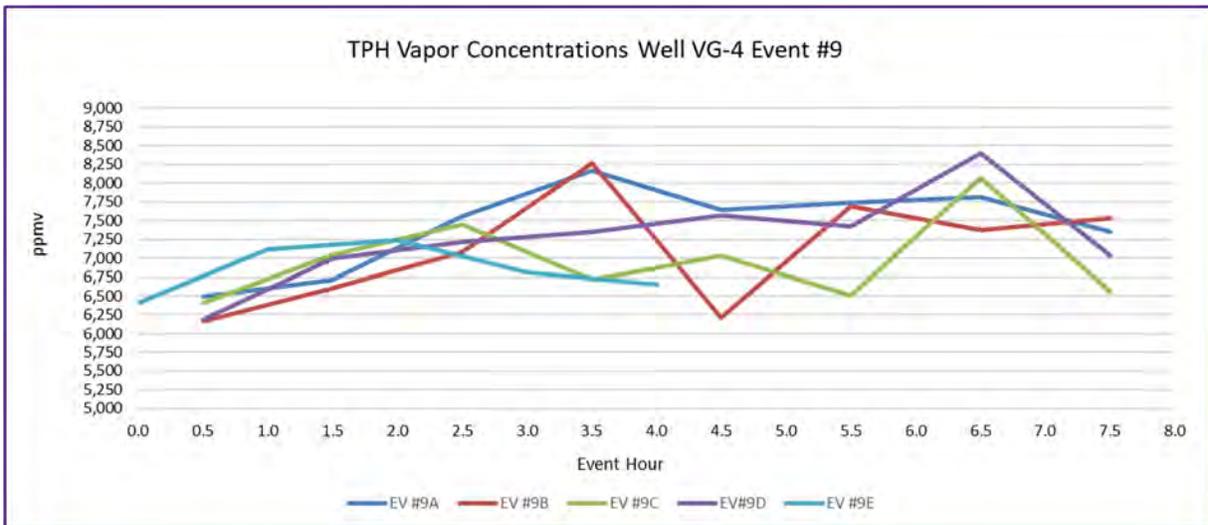
The Recovery Summary Table below lists the vapor, groundwater and LNAPL recovery data for Event #9 on the dates shown.

Recovery Summary Well VG-4							
Event Number		Event #9A	Event #9B	Event #9C	Event #9D	Event #9E	Event #9
Event Date		02/07/2022	02/08/2022	02/08/2022	02/10/2022	02/11/2022	Total
Event Hours		16.0	24.0	24.0	24.0	12.0	100.0
<b>Data Element</b>							
Groundwater Recovery	gals	0	0	0	0	0	0
<b>LNAPL Recovery</b>							
Liquid	gals	0	0	0	0	0	0
Vapor	gals	4.28	6.86	7.02	7.06	3.51	28.73
Total	gals	4.28	6.86	7.02	7.06	3.51	28.73
Gallons/Hour	gph	0.27	0.29	0.29	0.29	0.29	0.29

- Total vapor hydrocarbons burned as IC engine fuel in the Recovery Summary Table above are based on the HORIBA® data recorded in the Influent Vapor Data Table below.

Influent Vapor Data Well VG-4						
Event Number		Event #9A	Event #9B	Event #9C	Event #9D	Event #9E
Event Date		02/07/2022	02/08/2022	02/08/2022	02/10/2022	02/11/2022
Event Hours		16.0	24.0	24.0	24.0	12.0
Data Element						
TPH- Maximum	ppmv	8,170	8,260	8,070	8,400	7,240
TPH- Average	ppmv	7,434	7,114	6,975	7,271	6,846
TPH- Minimum	ppmv	6,490	6,160	6,410	6,190	6,410
TPH- Initial	ppmv	6,490	6,160	6,410	6,190	6,410
TPH- Ending	ppmv	7,350	7,530	6,560	7,030	6,650
CO <sub>2</sub>	%	12.48	12.04	11.85	12.04	11.68
O <sub>2</sub>	%	2.8	2.8	2.7	2.3	2.2
H <sub>2</sub> S	ppm	0	0	0	0	0

- The TPH vapor concentrations from the influent vapor samples for Event #9 are presented in the following graph.



- The extraction well induced vacuum and well vapor flow for Event #9 are presented in the following table.

Well Vacuum and Well Vapor Flow						
Well VG-4						
Event Number		Event #9A	Event #9B	Event #9C	Event #9D	Event #9E
Event Date		02/07/2022	02/08/2022	02/08/2022	02/10/2022	02/11/2022
Event Hours		16.0	24.0	24.0	24.0	12.0
Data Element						
Well Vacuum- Maximum	InH <sub>2</sub> O	70.00	70.00	70.00	70.00	85.00
Well Vacuum- Average	InH <sub>2</sub> O	62.94	68.24	70.00	70.00	79.41
Well Vacuum- Minimum	InH <sub>2</sub> O	50.00	60.00	70.00	70.00	70.00
Well Vapor Flow- Maximum	scfm	20.01	20.10	20.10	20.12	21.98
Well Vapor Flow- Average	scfm	17.86	19.80	20.01	20.03	20.90
Well Vapor Flow- Minimum	scfm	13.86	18.73	19.95	19.97	18.43

- The LNAPL thickness recorded at the start and conclusion of Event #9 is contained in the following table.

LNAPL Thickness Data			
Well VG-4			
Event Number		Event #9A	Event #9E
Event Date		02/07/2022	02/11/2022
Event Hours		16.0	12.0
Event Start			
Depth to Groundwater	Ft BTOC	68.07	NM
Depth to LNAPL	Ft BTOC	-	-
LNAPL Thickness	ft	-	-
Hydro Equivalent	Ft BTOC	68.07	NM
Event Conclusion			
Depth to Groundwater	Ft BTOC	NM	68.07
Depth to LNAPL	Ft BTOC	-	-
LNAPL Thickness	ft	-	-
Hydro Equivalent	Ft BTOC	NM	68.07

NM- Not Measured

**ADDITIONAL INFORMATION**

- All LNAPL volume recovered, 28.73 gals, was burned as IC engine fuel.

**METHOD OF CALIBRATION AND CALCULATIONS**

The HORIBA® Analytical instrument is calibrated with Hexane, and CO<sub>2</sub> in accordance with the manufacturer’s specifications.

The formula used to calculate the emission rate is:

$$ER = HC \text{ (ppmv)} \times MW \text{ (Hexane)} \times \text{Flow Rate (scfm)} \times 1.58E^{-7} \frac{\text{(min)}(\text{lb mole})}{\text{(hr)}(\text{ppmv})(\text{ft}^3)} = \text{lbs/hr}$$

**INFORMATION INCLUDED WITH REPORT**

- Table #1 Summary Well Data
- Table #2 Summary Recovery Data
- Recorded Data

After you have reviewed the report and if you have any questions, please contact me. We appreciate you selecting AcuVac to provide these services.

Sincerely,  
ACUVAC REMEDIATION, LLC



Paul D. Faucher  
President

**Summary Well Data  
Table #1**

Event		9A	9B	9C	9D	9E
WELL NO.		VG-4	VG-4	VG-4	VG-4	VG-4
Current Event Hours		16.0	24.0	24.0	24.0	12
Total Event Hours		255.0	279.0	303.0	237.0	339.0
TD (estimated)	ft BGS	73.8	73.8	73.8	73.8	73.8
Well Screen	ft BGS	unknown	unknown	unknown	unknown	unknown
Well Size	in	4.0	4.0	4.0	4.0	4.0
<b>Well Data</b>						
Depth to LNAPL - Static - Start Event	ft BTOC	-	NM	NM	NM	NM
Depth to Groundwater - Static - Start Event	ft BTOC	68.07	NM	NM	NM	NM
LNAPL Thickness	ft	-	-	-	-	-
Hydro-Equivalent- Beginning	ft BTOC	68.07	-	-	-	-
Depth to LNAPL - End Event	ft BTOC	NM	NM	NM	NM	-
Depth to Groundwater - End Event	ft BTOC	NM	NM	NM	NM	68.07
LNAPL Thickness	ft	-	-	-	-	-
Hydro-Equivalent- Ending	ft BTOC	-	-	-	-	68.07
<b>Extraction Data</b>						
Maximum Extraction Well Vacuum	InH <sub>2</sub> O	70.00	70.00	70.00	70.00	70.00
Average Extraction Well Vacuum	InH <sub>2</sub> O	62.94	68.24	70.00	70.00	70.00
Minimum Extraction Well Vacuum	InH <sub>2</sub> O	50.00	60.00	70.00	70.00	70.00
Maximum Extraction Well Vapor Flow	scfm	20.01	20.10	20.10	20.12	20.06
Average Extraction Well Vapor Flow	scfm	17.86	19.80	20.01	20.03	20.03
Minimum Extraction Well Vapor Flow	scfm	13.86	18.73	19.95	19.97	19.99
<b>Influent Data</b>						
Maximum TPH	ppmv	8,170	8,260	8,070	8,400	7,240
Average TPH	ppmv	7,434	7,114	6,975	7,271	6,846
Maximum TPH	ppmv	6,490	6,160	6,410	6,190	6,410
Initial TPH	ppmv	6,490	6,160	6,410	6,190	6,410
Final TPH	ppmv	7,350	7,530	6,560	7,030	6,650
Average CO <sub>2</sub>	%	12.48	12.04	11.85	12.04	11.68
Average O <sub>2</sub>	%	2.8	2.8	2.7	2.3	2.2
Average H <sub>2</sub> S	ppm	0	0	0	0	0

**Summary Recovery Data  
Table #2**

Event		9A	9B	9C	9D	9E
WELL NO.		VG-4	VG-4	VG-4	VG-4	VG-4
<b>Recovery Data- Current Event</b>						
Total Liquid Volume Recovered	gals	-	-		-	-
Total Liquid LNAPL Recovered	gals	-	-		-	-
Total Liquid LNAPL Recovered / Total Liquid	%	-	-		-	-
Total Liquid LNAPL Recovered / Total LNAPL	%	-	-		-	-
Total Vapor LNAPL Recovered	gals	4.28	6.86	7.02	7.06	3.51
Total Vapor LNAPL Recovered / Total LNAPL	%	100.00	100.00	100.00	100.00	100.00
Total Vapor and Liquid LNAPL Recovered	gals	4.28	6.86	7.02	7.06	3.51
Average LNAPL Recovery	gals/hr	0.27	0.29	0.29	0.29	0.29
Total LNAPL Recovered	lbs	29.96	48.03	49.17	49.42	24.58
Total Volume of Well Vapors	cu. ft	17,146	28,512	28,814	28,843	14,422
<b>Recovery Data- Cumulative</b>						
Total Liquid Volume Recovered	gals	27,394	27,394	27,394	27,394	27,394
Total Liquid LNAPL Recovered	gals	7.99	7.99	7.99	7.99	7.99
Total Vapor LNAPL Recovered	gals	67.06	73.92	80.94	88.00	91.52
Total Vapor and Liquid LNAPL Recovered	gals	75.04	81.91	88.93	95.99	99.50
Average LNAPL Recovery	gals/hr	0.29	0.29	0.29	0.29	0.29
Total LNAPL Recovered	lbs	1,363	1,411	1,460	1,510	1,534
Total Volume of Well Vapors	cu. ft	223,959	252,471	281,285	310,129	324,550



OPERATING DATA - EVENT # **9A** PAGE # **1** ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well # <b>VG-4</b>	Date	<b>2-7-22</b>					
	Time	<b>0800</b>	<b>0830</b>	<b>0900</b>	<b>0930</b>	<b>1000</b>	<b>1030</b>
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	<b>1900</b>	<b>1900</b>	<b>1900</b>	<b>1900</b>	<b>1900</b>
	Oil Pressure	psi	<b>55</b>	<b>55</b>	<b>55</b>	<b>55</b>	<b>55</b>
	Water Temp	°F	<b>130</b>	<b>130</b>	<b>130</b>	<b>130</b>	<b>130</b>
	Alternator	Volts	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>
	Intake Vacuum	"Hg	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>
	Gas Flow Fuel/Propane	cfh	<b>120</b>	<b>120</b>	<b>120</b>	<b>120</b>	<b>130</b>
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	<b>50</b>	<b>50</b>	<b>55</b>	<b>55</b>	<b>60</b>
	Extraction Well Flow	scfm	<b>13.86</b>	<b>13.86</b>	<b>15.45</b>	<b>15.44</b>	<b>17.01</b>
	Well Flow Ref Number		<b>16</b>	<b>16</b>	<b>18</b>	<b>18</b>	<b>20</b>
	Influent Vapor Temp.	°F	<b>58</b>	<b>58</b>	<b>59</b>	<b>60</b>	<b>60</b>
	Groundwater Temp.	°F	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
	Air Temp	°F	<b>28</b>	<b>30</b>	<b>33</b>	<b>37</b>	<b>40</b>
	Barometric Pressure	In Hg	<b>30.16</b>	<b>30.16</b>	<b>30.15</b>	<b>30.15</b>	<b>30.15</b>
	Absolute Pressure	In Hg	<b>26.49</b>	<b>26.49</b>	<b>26.49</b>	<b>26.49</b>	<b>26.49</b>
VAPOR / INFLUENT	TPH	ppmv	<b>-</b>	<b>6490</b>	<b>-</b>	<b>6710</b>	<b>-</b>
	CO <sub>2</sub>	%	<b>-</b>	<b>12.3</b>	<b>-</b>	<b>12.22</b>	<b>-</b>
	O <sub>2</sub>	%	<b>-</b>	<b>2.9</b>	<b>-</b>	<b>3.2</b>	<b>-</b>
	H <sub>2</sub> S	ppm	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
EVR	EVR Pressure	psi	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
	EVR Flow	cfh	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
NOTES	<p>Arrived at site 0730, Tailgate safety meeting &amp; MSD reviews                      Found start of 0800, Initial E6T on engine ↑11.5, Reduced                      ambient air and increased propane, E6T ↓ to 9.0, started                      at 0900 increasing well flow.</p>						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL	<b>-</b>				
	Extraction Well	DTGW	<b>68.07</b>				



OPERATING DATA - EVENT # **9A** PAGE # **2** ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George					
Well #	Date	2-7-22						
	Time	1100	1130	1200	1230	1300	1330	
	Hr Meter							
ENGINE / BLOWER	Engine Speed	RPM	1900	1900	1900	1900	1900	1900
	Oil Pressure	psi	55	55	55	55	55	55
	Water Temp	°F	130	130	130	135	135	135
	Alternator	Volts	14	14	14	14	14	14
	Intake Vacuum	"Hg	18	18	18	16	16	16
	Gas Flow Fuel/Propane	cfh	130	130	130	135	135	135
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	65	65	70	70
	Extraction Well Flow	scfm	17.01	17.01	18.52	18.52	20.01	20.01
	Well Flow Ref Number		20	20	22	22	24	24
	Influent Vapor Temp.	°F	60	60	62	62	63	63
	Groundwater Temp.	°F	-	-	-	-	-	-
	Air Temp	°F	45	46	47	48	49	49
	Barometric Pressure	In Hg	30.13	30.13	30.11	30.08	30.06	30.06
	Absolute Pressure	In Hg	26.48	26.48	26.46	26.44	26.42	26.40
VAPOR / INFLUENT	TPH	ppmv	-	8170	-	7640	-	7740
	CO <sub>2</sub>	%	-	12.62	-	12.46	-	12.74
	O <sub>2</sub>	%	-	2.8	-	2.9	-	2.3
	H <sub>2</sub> S	ppm	-	-	-	-	-	-
EVR	EVR Pressure	psi	5	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-	-
NOTES	Gradually ↑ vacuum & well flow as balanced with air flow +							
	EGT temp. FGT 8.5.							
RECOVERY	Totalizer	gals						
	Pump Rate	gals/min						
	Total Volume	gals						
	NAPL	% Vol						
	NAPL	Gals						
EW	Data Logger Head	ft						
	GW Depression	ft						
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						



OPERATING DATA - EVENT # **9A**

PAGE # **3**

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well # <b>VG-4</b>	Date	<b>2-7-22</b>					
	Time	<b>1400</b>	<b>1430</b>	<b>1500</b>	<b>1530</b>	<b>1600</b>	
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	<b>1900</b>	<b>1900</b>	<b>1900</b>	<b>1900</b>	<b>1900</b>
	Oil Pressure	psi	<b>55</b>	<b>55</b>	<b>55</b>	<b>55</b>	<b>55</b>
	Water Temp	°F	<b>130</b>	<b>130</b>	<b>130</b>	<b>130</b>	<b>130</b>
	Alternator	Volts	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>
	Intake Vacuum	"Hg	<b>16</b>	<b>16</b>	<b>16</b>	<b>16</b>	<b>16</b>
	Gas Flow Fuel/Propane	cfh	<b>135</b>	<b>135</b>	<b>135</b>	<b>135</b>	<b>135</b>
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	<b>70</b>	<b>70</b>	<b>70</b>	<b>70</b>	<b>70</b>
	Extraction Well Flow	scfm	<b>20.01</b>	<b>19.99</b>	<b>19.99</b>	<b>19.99</b>	<b>19.99</b>
	Well Flow Ref Number		<b>24</b>	<b>24</b>	<b>24</b>	<b>24</b>	<b>24</b>
	Influent Vapor Temp.	°F	<b>63</b>	<b>64</b>	<b>64</b>	<b>64</b>	<b>64</b>
	Groundwater Temp.	°F	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
	Air Temp	°F	<b>49</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>
	Barometric Pressure	In Hg	<b>30.05</b>	<b>30.03</b>	<b>30.02</b>	<b>30.01</b>	<b>30.00</b>
	Absolute Pressure	In Hg	<b>26.40</b>	<b>26.39</b>	<b>26.38</b>	<b>26.37</b>	<b>26.36</b>
VAPOR / INFLUENT	TPH	ppmv	<b>-</b>	<b>7810</b>	<b>-</b>	<b>7350</b>	<b>-</b>
	CO <sub>2</sub>	%	<b>-</b>	<b>12.64</b>	<b>-</b>	<b>12.48</b>	<b>-</b>
	O <sub>2</sub>	%	<b>-</b>	<b>2.7</b>	<b>-</b>	<b>2.8</b>	<b>-</b>
	H <sub>2</sub> S	ppm	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
EVR	EVR Pressure	psi	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
	EVR Flow	cfh	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
NOTES	<b>Unit left on overnight. Flow reading = 10033.8, @ 1600.</b>						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # **9B**

PAGE # **1**

ACUVAC MDPE SYSTEM

Location: **Vacuum Glorietta Site, Lea County, NM** Project Managers: **Hendley / George**

Well #	Date	Time	Hr Meter					
			0730	0800	0830	0900	0930	1000
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55	55
	Water Temp	°F	130	130	130	130	130	130
	Alternator	Volts	14	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	135	135	135	135	135	135
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	70	60	60	60	70	70
	Extraction Well Flow	scfm	20.10	18.75	18.75	18.73	20.06	20.06
	Well Flow Ref Number		24	22	22	22	24	24
	Influent Vapor Temp.	°F	58	58	58	59	60	60
	Groundwater Temp.	°F	-	-	-	-	-	-
	Air Temp	°F	30	31	37	44	50	51
	Barometric Pressure	In Hg	29.85	29.85	29.85	29.86	29.86	29.86
	Absolute Pressure	In Hg	26.23	26.23	26.23	26.24	26.24	26.24
VAPOR / INFLUENT	TPH	ppmv	-	6160	-	6600	-	7080
	CO <sub>2</sub>	%	-	11.94	-	11.52	-	12.06
	O <sub>2</sub>	%	-	3.2	-	3.9	✓	2.9
	H <sub>2</sub> S	ppm	-	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-	-
NOTES	Arrived at site 0730. System ran overnight. Tailgate safety meeting EGT at 10.5. Decreased air and vacuum temperature to decrease EGT. When EGT at 9.0 increased air, propane and well flow.							
RECOVERY	Totalizer	gals						
	Pump Rate	gals/min						
	Total Volume	gals						
	NAPL	% Vol						
	NAPL	Gals						
EW	Data Logger Head	ft						
	GW Depression	ft						
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						



OPERATING DATA - EVENT # **9B** PAGE # **2** ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	2-8-22					
	Time	1030	1100	1130	1200	1230	1300
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	130	130	130	130	130
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	135	135	135	135	135
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	70	70	70	70	70
	Extraction Well Flow	scfm	20.04	20.04	20.03	20.03	20.01
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	61	61	62	62	63
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	53	56	57	58	59
	Barometric Pressure	In Hg	29.85	29.83	29.82	29.80	29.78
	Absolute Pressure	In Hg	26.23	26.21	26.20	26.18	26.16
VAPOR / INFLUENT	TPH	ppmv	-	8260	-	6210	-
	CO <sub>2</sub>	%	-	12.22	-	10.88	-
	O <sub>2</sub>	%	-	2.1	-	3.3	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT #

9B

PAGE #

3

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	2-8-22					
	Time	1330	1400	1430	1500	1530	
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	130	130	130	130	130
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	135	135	135	135	135
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	70	70	70	70	70
	Extraction Well Flow	scfm	20.01	19.99	19.99	19.99	19.99
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	63	64	64	64	64
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	59	60	61	63	63
	Barometric Pressure	In Hg	29.75	29.74	29.74	29.74	29.74
	Absolute Pressure	In Hg	26.14	26.13	26.13	26.14	26.14
VAPOR / INFLUENT	TPH	ppmv	-	7380	-	7530	-
	CO <sub>2</sub>	%	-	12.54	-	12.48	-
	O <sub>2</sub>	%	-	2.1	-	2.7	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT #

9C

PAGE #

1

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George					
Well #	Date	2-9-22						
	Time	0730	0800	0830	0900	0930	1000	
	Hr Meter							
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55	55
	Water Temp	°F	130	130	130	130	130	130
	Alternator	Volts	14	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	135	135	135	135	135	135
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	70	70	70	70	70	70
	Extraction Well Flow	scfm	20.10	20.10	20.08	20.06	20.03	20.03
	Well Flow Ref Number		24	24	24	24	24	24
	Influent Vapor Temp.	°F	58	58	59	60	62	62
	Groundwater Temp.	°F	-	-	-	-	-	-
	Air Temp	°F	31	31	37	42	49	51
	Barometric Pressure	In Hg	29.87	29.87	29.87	29.87	29.87	29.86
	Absolute Pressure	In Hg	26.25	26.25	26.25	26.25	26.25	26.24
VAPOR / INFLUENT	TPH	ppmv	-	6410	-	7050	-	7450
	CO <sub>2</sub>	%	-	12.24	-	11.96	-	12.36
	O <sub>2</sub>	%	-	2.9	-	2.5	-	2.1
	H <sub>2</sub> S	ppm	-	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-	-
NOTES	Arrived at site 0730, System ran overnight, Tailgate safety meeting, Upon arrival EGT was 10, Reduced to 9.							
RECOVERY	Totalizer	gals						
	Pump Rate	gals/min						
	Total Volume	gals						
	NAPL	% Vol						
	NAPL	Gals						
EW	Data Logger Head	ft						
	GW Depression	ft						
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						



OPERATING DATA - EVENT # **9C** PAGE # **2** ACUVAC MDPE SYSTEM

Location: Vacuum Goriotta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	2-9-23					
	Time	1030	1100	1130	1200	1230	1300
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	130	130	130	130	130
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	135	135	135	135	135
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	70	70	70	70	70
	Extraction Well Flow	scfm	20.01	20.01	20.01	19.99	19.99
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	63	63	63	64	64
	Groundwater Temp.	°F	—	—	—	—	—
	Air Temp	°F	53	55	57	59	60
	Barometric Pressure	In Hg	29.85	29.84	29.82	29.80	29.76
	Absolute Pressure	In Hg	26.23	26.22	26.20	26.19	26.16
VAPOR / INFLUENT	TPH	ppmv	—	6720	—	7030	—
	CO <sub>2</sub>	%	—	11.78	—	12.06	—
	O <sub>2</sub>	%	—	2.6	—	2.6	—
	H <sub>2</sub> S	ppm	—	—	—	—	—
EVR	EVR Pressure	psi					
	EVR Flow	cfh					
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



Location: Vacuum Goriotta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	2-9-22					
	Time	1330	1400	1430	1500	1530	
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	130	130	130	130	130
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	135	135	135	135	135
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	70	70	70	70	70
	Extraction Well Flow	scfm	19.97	19.97	19.95	19.95	19.95
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	65	65	66	66	66
	Groundwater Temp.	°F	—	—	—	—	—
	Air Temp	°F	62	62	63	63	63
	Barometric Pressure	In Hg	29.72	29.72	29.71	29.70	29.70
	Absolute Pressure	In Hg	26.13	26.12	26.11	26.10	26.10
VAPOR / INFLUENT	TPH	ppmv	—	8070	—	6560	—
	CO <sub>2</sub>	%	—	12.08	—	11.16	—
	O <sub>2</sub>	%	—	1.9	—	3.3	—
	H <sub>2</sub> S	ppm	—	—	—	—	—
EVR	EVR Pressure	psi	—	—	—	—	—
	EVR Flow	cfh	—	—	—	—	—
NOTES	Hour meter 10081.5 at departure						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT #

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PAGE #

1

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	2-10-22					
	Time	0730	0800	0830	0900	0930	1000
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	130	130	130	130	130
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	135	135	135	135	135
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	70	70	70	70	70
	Extraction Well Flow	scfm	20.12	20.12	20.10	20.10	20.06
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	57	57	58	58	60
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	31	34	39	43	47
	Barometric Pressure	In Hg	29.85	29.85	29.85	29.86	29.87
	Absolute Pressure	In Hg	26.30	26.30	26.30	26.30	28.29
VAPOR / INFLUENT	TPH	ppmv	-	6190	-	6990	-
	CO <sub>2</sub>	%	-	11.38	-	12.24	-
	O <sub>2</sub>	%	-	2.7	-	2.4	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES	Arrived at site 0730. Tailgate safety meeting. System ran overnight.						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # **9D** PAGE # **2** ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	2-10-20					
	Time	1030	1100	1130	1200	1230	1300
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	130	130	130	130	130
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	135	135	135	135	135
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	70	70	70	70	70
	Extraction Well Flow	scfm	20.04	20.03	20.01	19.99	19.99
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	61	62	63	64	64
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	52	55	57	59	59
	Barometric Pressure	In Hg	29.85	29.84	29.82	29.80	29.80
	Absolute Pressure	In Hg	26.27	26.25	26.35	26.34	26.30
VAPOR / INFLUENT	TPH	ppmv	-	7356	-	7570	-
	CO <sub>2</sub>	%	-	12.28	-	11.98	-
	O <sub>2</sub>	%	-	2.2	-	2.1	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # *9D*

PAGE # *3*

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well # <i>V6-4</i>	Date	<i>2-10-22</i>					
	Time	<i>1330</i>	<i>1400</i>	<i>1430</i>	<i>1500</i>	<i>1530</i>	
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	<i>1800</i>	<i>1800</i>	<i>1800</i>	<i>1800</i>	<i>1800</i>
	Oil Pressure	psi	<i>55</i>	<i>55</i>	<i>55</i>	<i>55</i>	<i>55</i>
	Water Temp	°F	<i>130</i>	<i>130</i>	<i>130</i>	<i>130</i>	<i>130</i>
	Alternator	Volts	<i>14</i>	<i>14</i>	<i>14</i>	<i>14</i>	<i>14</i>
	Intake Vacuum	"Hg	<i>16</i>	<i>16</i>	<i>16</i>	<i>16</i>	<i>16</i>
	Gas Flow Fuel/Propane	cfh	<i>135</i>	<i>135</i>	<i>135</i>	<i>135</i>	<i>135</i>
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	<i>70</i>	<i>70</i>	<i>70</i>	<i>70</i>	<i>70</i>
	Extraction Well Flow	scfm	<i>19.97</i>	<i>19.97</i>	<i>19.97</i>	<i>19.97</i>	<i>19.97</i>
	Well Flow Ref Number		<i>24</i>	<i>24</i>	<i>24</i>	<i>24</i>	<i>24</i>
	Influent Vapor Temp.	°F	<i>65</i>	<i>65</i>	<i>65</i>	<i>65</i>	<i>65</i>
	Groundwater Temp.	°F	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
	Air Temp	°F	<i>60</i>	<i>60</i>	<i>60</i>	<i>61</i>	<i>61</i>
	Barometric Pressure	In Hg	<i>29.77</i>	<i>29.76</i>	<i>29.75</i>	<i>29.72</i>	<i>29.72</i>
	Absolute Pressure	In Hg	<i>26.23</i>	<i>26.20</i>	<i>26.16</i>	<i>26.13</i>	<i>26.13</i>
VAPOR / INFLUENT	TPH	ppmv	<i>-</i>	<i>8400</i>	<i>-</i>	<i>7030</i>	<i>-</i>
	CO <sub>2</sub>	%	<i>-</i>	<i>12.10</i>	<i>-</i>	<i>11.04</i>	<i>-</i>
	O <sub>2</sub>	%	<i>-</i>	<i>1.6</i>	<i>-</i>	<i>2.3</i>	<i>-</i>
	H <sub>2</sub> S	ppm	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
EVR	EVR Pressure	psi	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
	EVR Flow	cfh	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
NOTES	<i>Hour meter = on departure,</i>						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT #

9E

PAGE #

1

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	2-11-22					
	Time	0800	0830	0900	0930	1000	1030
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	130	130	130	130	130
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	135	135	135	135	135
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	70	70	70	70	70
	Extraction Well Flow	scfm	20.06	20.06	20.04	20.04	20.03
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	60	60	61	61	62
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	34	40	48	59	62
	Barometric Pressure	In Hg	29.90	29.90	29.88	29.87	29.86
	Absolute Pressure	In Hg	26.36	26.36	26.36	26.36	26.36
VAPOR / INFLUENT	TPH	ppmv	6410	-	7120	-	7240
	CO <sub>2</sub>	%	11.58	-	12.04	-	11.86
	O <sub>2</sub>	%	2.4	-	1.6	-	2.0
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi					
	EVR Flow	cfh					
NOTES	Arrived at site 0745. System ran overnight. Tailgate safety meeting.						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # **9E** PAGE # **2** ACUVAC MDPE SYSTEM

Location: **Vacuum Glorietta Site, Lea County, NM** Project Managers: **Hendley / George**

Well # <b>VG-4</b>	Date	<b>2-11-22</b>				
	Time	<b>1100</b>	<b>1130</b>	<b>1200</b>		
	Hr Meter					

ENGINE / BLOWER	Engine Speed	RPM	<b>1800</b>	<b>1800</b>	<b>1800</b>	
	Oil Pressure	psi	<b>55</b>	<b>55</b>	<b>55</b>	
	Water Temp	°F	<b>130</b>	<b>130</b>	<b>130</b>	
	Alternator	Volts	<b>14</b>	<b>14</b>	<b>14</b>	
	Intake Vacuum	"Hg	<b>16</b>	<b>16</b>	<b>16</b>	
	Gas Flow Fuel/Propane	cfh	<b>135</b>	<b>135</b>	<b>135</b>	

ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	<b>70</b>	<b>70</b>	<b>70</b>	
	Extraction Well Flow	scfm	<b>19.99</b>	<b>19.99</b>	<b>19.99</b>	
	Well Flow Ref Number		<b>24</b>	<b>24</b>	<b>24</b>	
	Influent Vapor Temp.	°F	<b>64</b>	<b>64</b>	<b>64</b>	
	Groundwater Temp.	°F	<b>-</b>	<b>-</b>	<b>-</b>	
	Air Temp	°F	<b>64</b>	<b>64</b>	<b>64</b>	
	Barometric Pressure	In Hg	<b>29.85</b>	<b>29.84</b>	<b>29.83</b>	
	Absolute Pressure	In Hg	<b>26.35</b>	<b>26.35</b>	<b>26.35</b>	

VAPOR / INFLUENT	TPH	ppmv	<b>6810</b>	<b>-</b>	<b>6650</b>	
	CO <sub>2</sub>	%	<b>11.54</b>	<b>-</b>	<b>11.40</b>	
	O <sub>2</sub>	%	<b>2.6</b>	<b>-</b>	<b>2.3</b>	
	H <sub>2</sub> S	ppm	<b>-</b>	<b>-</b>	<b>-</b>	

EVR	EVR Pressure	psi				
	EVR Flow	cfh				

**NOTES**  
 Event end @ 100. Demobed and left site at 12:25.

RECOVERY	Totalizer	gals				
	Pump Rate	gals/min				
	Total Volume	gals				
	NAPL	% Vol				
	NAPL	Gals				

EW	Data Logger Head	ft				
	GW Depression	ft				
	Extraction Well	DTNAPL				
	Extraction Well	DTGW				



May 23, 2022

Mr. Chuck Terhune, PG  
 Project Manager  
 Tetra Tech  
 2500 City West Blvd, Suite 1000  
 Houston, TX 77042

Dear Chuck:

Re: Vacuum Glorietta Site, Lea County, NM, (Event #10)

At your request, AcuVac Remediation, LLC (AcuVac) performed five Soil Vapor Extraction (SVE) Events: #10A, #10B, #10C, #10D and #10E at the above referenced site (Site as outlined in the table below. The following is the report and a copy of the operating data collected during Event #10. Additionally, the attached Table #1 contains the Summary Well Data, and Table #2 contains the Summary Recovery Data.

Event Number	Well Number	Event Type	Event Duration (hrs)	Date
#10A	VG-4	SVE	24.0	05/16/2022
#10B	VG-4	SVE	24.0	05/17/2022
#10C	VG-4	SVE	24.0	05/18/2022
#10D	VG-4	SVE	24.0	05/19/2022
#10E	VG-4	SVE	4.0	05/20/2022

The event hours for each day are based on the start time of the event 0730 hrs. and ending at 0730 hrs. on the following day.

The purpose of the events was to enhance recovery of phase separated hydrocarbons (PSH) present at the Site through the removal of petroleum hydrocarbons in both liquid and vapor phases. PSH refers to both petroleum hydrocarbons and Non-Aqueous Phase Liquids (NAPL). The source of the PSH is a historical pipeline release.

## OBJECTIVES

The objectives of the SVE Events:

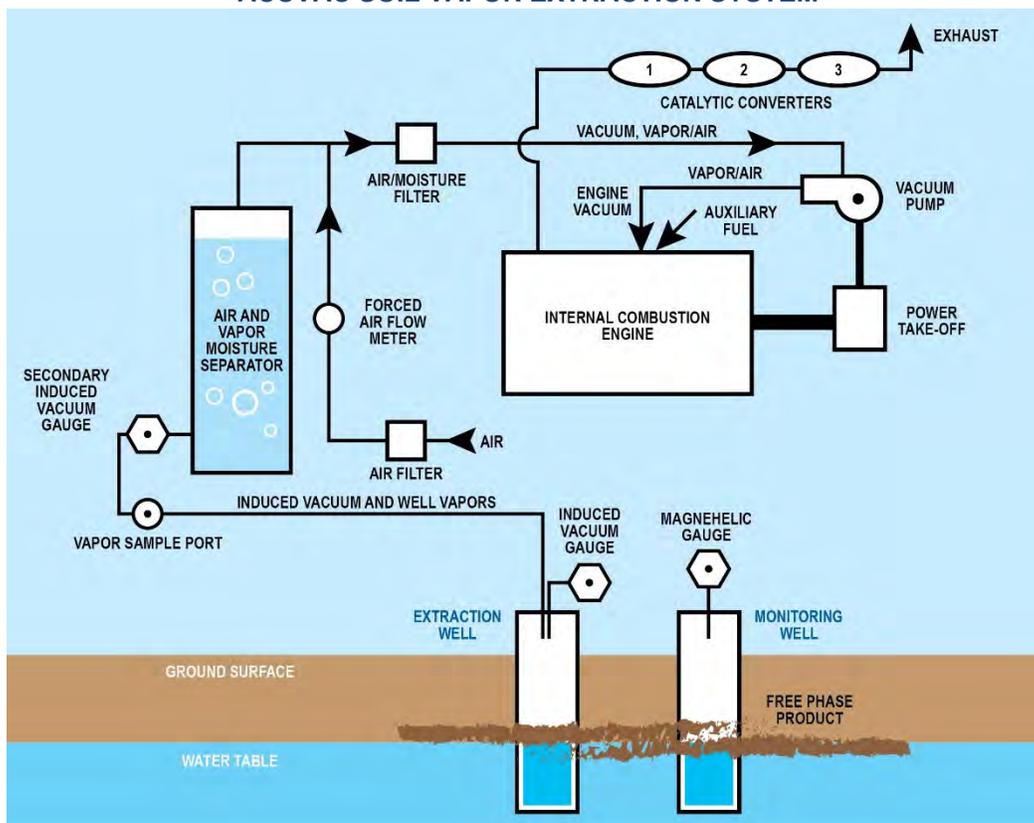
- Maximize liquid and vapor phase petroleum hydrocarbon removal from groundwater and soils in the subsurface formations within the influence of the extraction well.
- Expose the capillary fringe area and below to the extraction well induced vacuums.
- Increase the liquid and vapor phase petroleum hydrocarbon specific yields with high induced vacuums.

**METHODS AND EQUIPMENT**

AcuVac owns and maintains an inventory of equipment to perform SVE events and uses no third-party equipment. The events at the Site were conducted using the AcuVac I-6 System (System) with a Roots RAI-33 blower, used as a vacuum pump, and a Roots RAI-22 positive displacement blower. The table below lists additional equipment and instrumentation employed, and the data element captured by each.

Equipment and Instrumentation Employed by AcuVac	
Measurement Equipment	Data Element
<b>Extraction Well Induced Vacuum and Flow</b>	
Dwyer Magnehelic Gauges	Extraction Well Vacuum
Dwyer Averaging Pitot Tubes / Magnehelic Gauges	Extraction Well Vapor Flow
<b>Observation Wells</b>	
Dwyer Digital Manometer	Vacuum / Pressure Influence
<b>Extraction Well Vapor Monitoring</b>	
AcuVac V-1 Vacuum Box	Extraction Well Non-Diluted Vapor Sample Collection
HORIBA® Analyzer	Extraction Well Vapor TPH Concentration
RKI 1200 O <sub>2</sub> Monitor	Extraction Well Vapor Oxygen Content
<b>NAPL Thickness (if present)</b>	
Solinst Interface Probes Model 122	Depth to LNAPL and Depth to Groundwater
<b>Atmospheric Conditions</b>	
Testo Model 511	Relative and Absolute Barometric Pressure

**ACUVAC SOIL VAPOR EXTRACTION SYSTEM**



The vacuum extraction portion of the System consists of a vacuum pump driven by an internal combustion engine (IC engine). The vacuum pump connects to the extraction well, and the vacuum created on the extraction well causes light hydrocarbons in the soil and in the groundwater to volatilize and flow through a moisture knockout tank to the vacuum pump and the IC engine where they burn as part of the normal combustion process. Auxiliary propane powers the engine if the well vapors do not provide the required energy.

The IC engine provides the power necessary to achieve and maintain high induced vacuums and/or high well vapor flows needed to maximize the vacuum radius of influence.

Emissions from the engine pass through three catalytic converters to maximize destruction of effluent hydrocarbon vapors. The engine's fuel-to-air ratio is adjusted to maintain efficient combustion. Because the engine powers all equipment, the System stops when the engine stops preventing an uncontrolled release of hydrocarbons. Since the System operates entirely under vacuum, any leaks in the seals or connections leak into the System and not the atmosphere. Vacuum loss, low oil pressure, over-speed, or overheating automatically shut down the engine.

The design of the AcuVac System enables independent control of both the induced well vacuum and the groundwater pumping functions such that the AcuVac team controls the induced hydraulic gradient to increase exposure of the formation to soil vapor extraction (SVE). The ability to separate the vapor and liquid flows within the extraction well improve the LNAPL recovery rates and enabled the AcuVac team to record data specific to each media.

#### **RECOVERY SUMMARY FOR SVE EVENT #10**

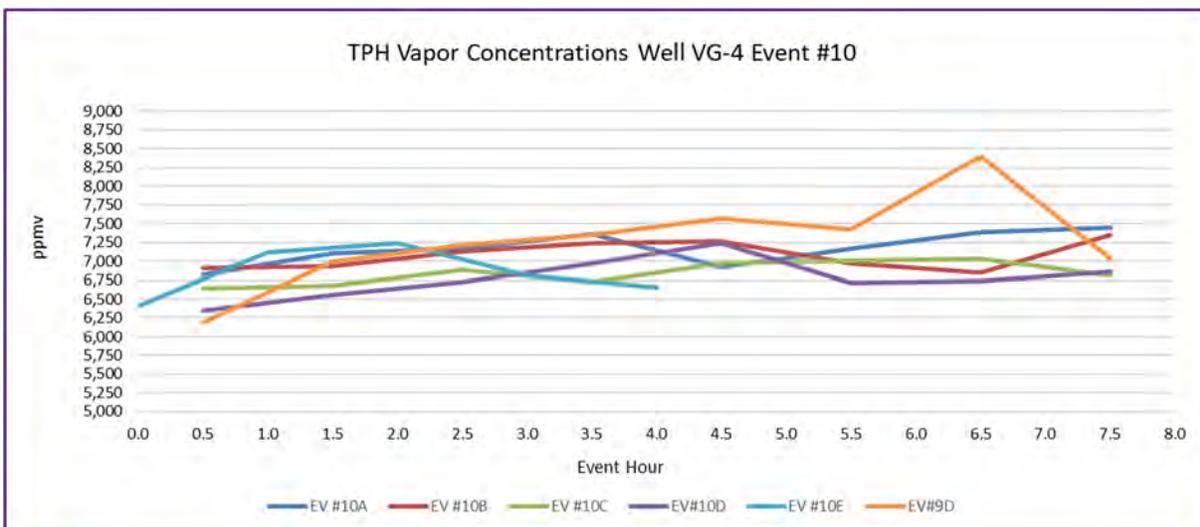
The Recovery Summary Table below lists the groundwater, liquid LNAPL, and PSH vapor recovery data for Event #10, on the dates shown and the results with all prior events performed on well VG-4.

Recovery Summary Well VG-4							
Event Number		Event #10A	Event #10B	Event #10C	Event #10D	Event #10E	Event #10
Event Date		05/16/2022	05/17/2022	05/18/2022	05/19/2022	05/20/2022	Total
Event Hours		24.0	24.0	24.0	24.0	4.0	100.0
<b>Data Element</b>							
<b>Groundwater Recovery</b>	gals	0	0	0	0	0	0
<b>LNAPL Recovery</b>							
<b>Liquid</b>	gals	0	0	0	0	0	0
<b>Vapor</b>	gals	6.72	7.35	6.98	6.98	1.16	29.19
<b>Total</b>	gals	6.72	7.35	6.98	6.98	1.16	29.19
<b>Gallons/Hour</b>	gph	<b>0.28</b>	<b>0.31</b>	<b>0.29</b>	<b>0.29</b>	<b>0.29</b>	<b>0.29</b>

- Total vapor hydrocarbons burned as IC engine fuel in the Recovery Summary Table above are based on the HORIBA® data recorded in the Influent Vapor Data Table on the following page.

Influent Vapor Data Well VG-4						
Event Number		Event #10A	Event #10B	Event #10C	Event #10D	Event #10E
Event Date		05/16/2022	05/17/2022	05/18/2022	05/19/2022	05/20/2022
Event Hours		24.0	24.0	24.0	24.0	4.0
Data Element						
TPH- Maximum	ppmv	7,450	7,350	7,030	7,240	6,780
TPH- Average	ppmv	7,174	7,081	6,845	6,770	6,640
TPH- Minimum	ppmv	6,820	6,850	6,640	6,350	6,410
TPH- Initial	ppmv	6,820	6,910	6,640	6,350	6,410
TPH- Ending	ppmv	7,450	7,350	6,810	6,860	6,780
CO <sub>2</sub>	%	12.76	12.46	11.97	11.42	11.33
O <sub>2</sub>	%	2.9	3.1	3.2	3.4	3.6

- The TPH vapor concentrations from the influent vapor samples for Event #10 are presented in the following graph.



- The extraction well induced vacuum and well vapor flow for Event #10 are presented in the following table.

Well Vacuum and Well Vapor Flow Well VG-4						
Event Number		Event #10A	Event #10B	Event #10C	Event #10D	Event #10E
Event Date		05/16/2022	05/17/2022	05/18/2022	05/19/2022	05/20/2022
Event Hours		24.0	24.0	24.0	24.0	4.0
Data Element						
Well Vacuum- Maximum	InH <sub>2</sub> O	60.00	60.00	60.00	60.00	60.00
Well Vacuum- Average	InH <sub>2</sub> O	57.06	60.00	60.00	60.00	60.00
Well Vacuum- Minimum	InH <sub>2</sub> O	40.00	60.00	60.00	60.00	60.00
Well Vapor Flow- Maximum	scfm	20.18	20.30	20.34	20.30	20.30
Well Vapor Flow- Average	scfm	18.96	20.13	20.16	20.14	20.21
Well Vapor Flow- Minimum	scfm	14.88	20.03	20.05	20.03	20.13

- The LNAPL thickness recorded at the start and conclusion of Event #10 is contained in the following table.

LNAPL Thickness Data Well VG-4			
Event Number		Event #10A	Event #10E
Event Date		05/16/2022	05/20/2022
Event Hours		24.0	4.0
Event Start			
Depth to Groundwater	Ft BTOC	67.94	NM
Depth to LNAPL	Ft BTOC	-	-
LNAPL Thickness	ft	-	-
Hydro Equivalent	Ft BTOC	67.94	NM
Event Conclusion			
Depth to Groundwater	Ft BTOC	NM	67.42
Depth to LNAPL	Ft BTOC	-	-
LNAPL Thickness	ft	-	-
Hydro Equivalent	Ft BTOC	NM	67.42

NM- Not Measured

**ADDITIONAL INFORMATION**

- All LNAPL volume recovered, 29.19 gals, was burned as IC engine fuel. The LNAPL weighted recovery rate for Event #10 was 0.29 gals/hour.

**METHOD OF CALIBRATION AND CALCULATIONS**

The HORIBA® Analytical instrument is calibrated with Hexane and CO<sub>2</sub> in accordance with the manufacturer’s specifications.

The formula used to calculate the emission rate is:

$$ER = HC \text{ (ppmv)} \times MW \text{ (Hexane)} \times \text{Flow Rate (scfm)} \times 1.58E^{-7} \frac{\text{(min)(lb mole)}}{\text{(hr)(ppmv)(ft}^3\text{)}} = \text{lbs/hr}$$

**INFORMATION INCLUDED WITH REPORT**

- Table #1 Summary Well Data
- Table #2 Summary Recovery Data
- Recorded Data

After you have reviewed the report and if you have any questions, please contact me. We appreciate you selecting AcuVac to provide these services.

Sincerely,  
ACUVAC REMEDIATION, LLC



Paul D. Faucher  
President

**Summary Well Data  
Table #1**

Event		10A	10B	10C	10D	10E
WELL NO.		VG-4	VG-4	VG-4	VG-4	VG-4
Current Event Hours		24.0	24.0	24.0	24.0	4.0
Total Event Hours		363.0	387.0	411.0	435.0	439.0
TD (estimated)	ft BGS	73.8	73.8	73.8	73.8	73.8
Well Screen	ft BGS	unknown	unknown	unknown	unknown	unknown
Well Size	in	4.0	4.0	4.0	4.0	4.0
<b>Well Data</b>						
Depth to LNAPL - Static - Start Event	ft BTOC	-	NM	NM	NM	NM
Depth to Groundwater - Static - Start Event	ft BTOC	67.94	NM	NM	NM	NM
LNAPL Thickness	ft	-	-	-	-	-
Hydro-Equivalent- Beginning	ft BTOC	67.94	-	-	-	-
Depth to LNAPL - End Event	ft BTOC	NM	NM	NM	NM	-
Depth to Groundwater - End Event	ft BTOC	NM	NM	NM	NM	67.42
LNAPL Thickness	ft	-	-	-	-	-
Hydro-Equivalent- Ending	ft BTOC	-	-	-	-	67.42
<b>Extraction Data</b>						
Maximum Extraction Well Vacuum	InH <sub>2</sub> O	60.00	60.00	60.00	60.00	60.00
Average Extraction Well Vacuum	InH <sub>2</sub> O	57.06	60.00	60.00	60.00	60.00
Minimum Extraction Well Vacuum	InH <sub>2</sub> O	40.00	60.00	60.00	60.00	60.00
Maximum Extraction Well Vapor Flow	scfm	20.18	20.30	20.34	20.30	20.30
Average Extraction Well Vapor Flow	scfm	18.96	20.13	20.16	20.14	20.21
Minimum Extraction Well Vapor Flow	scfm	14.88	20.03	20.05	20.03	20.13
<b>Influent Data</b>						
Maximum TPH	ppmv	7,450	7,350	7,030	7,240	6,780
Average TPH	ppmv	7,174	7,081	6,845	6,770	6,640
Maximum TPH	ppmv	6,820	6,850	6,640	6,350	6,410
Initial TPH	ppmv	6,820	6,910	6,640	6,350	6,410
Final TPH	ppmv	7,450	7,350	6,810	6,860	6,780
Average CO <sub>2</sub>	%	12.76	12.46	11.97	11.42	11.33
Average O <sub>2</sub>	%	2.9	3.1	3.2	3.4	3.6

**Summary Recovery Data  
Table #2**

Event		10A	10B	10C	10D	10E
WELL NO.		VG-4	VG-4	VG-4	VG-4	VG-4
<b>Recovery Data- Current Event</b>						
Total Liquid Volume Recovered	gals	-	-	-	-	-
Total Liquid LNAPL Recovered	gals	-	-	-	-	-
Total Liquid LNAPL Recovered / Total Liquid	%	-	-	-	-	-
Total Liquid LNAPL Recovered / Total LNAPL	%	-	-	-	-	-
Total Vapor LNAPL Recovered	gals	6.72	7.35	6.98	6.98	1.16
Total Vapor LNAPL Recovered / Total LNAPL	%	100.00	100.00	100.00	100.00	100.00
Total Vapor and Liquid LNAPL Recovered	gals	6.72	7.35	6.98	6.98	1.16
Average LNAPL Recovery	gals/hr	0.28	0.31	0.29	0.29	0.29
Total LNAPL Recovered	lbs	47.04	51.45	48.86	48.86	8.12
Total Volume of Well Vapors	cu. ft	27,302	28,987	29,030	29,002	4,850
<b>Recovery Data- Cumulative</b>						
Total Liquid Volume Recovered	gals	27,394	27,394	27,394	27,394	27,394
Total Liquid LNAPL Recovered	gals	7.99	7.99	7.99	7.99	7.99
Total Vapor LNAPL Recovered	gals	56.76	64.11	71.09	78.07	79.23
Total Vapor and Liquid LNAPL Recovered	gals	64.75	72.10	79.08	86.06	87.22
Average LNAPL Recovery	gals/hr	0.18	0.19	0.19	0.20	0.20
Total LNAPL Recovered	lbs	1,669	1,721	1,769	1,818	1,826
Total Volume of Well Vapors	cu. ft	396,961	425,947	454,978	483,980	488,830



OPERATING DATA - EVENT # 10A

PAGE # 1

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	5/16/22					
	Time	0730	0800	0830	0900	0930	1000
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	130	130	140	145	145
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	17	17	17	17	17
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	40	40	50	60	60
	Extraction Well Flow	scfm	14.88	14.88	17.20	18.61	18.59
	Well Flow Ref Number		17	17	20	22	22
	Influent Vapor Temp.	°F	64	64	66	66	67
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	68	68	69	70	73
	Barometric Pressure	In Hg	29.70	29.70	29.71	29.71	29.71
	Absolute Pressure	In Hg	26.13	26.13	26.14	26.14	26.14
VAPOR / INFLUENT	TPH	ppmv	-	6820	-	7110	-
	CO <sub>2</sub>	%	-	12.62	-	12.82	-
	O <sub>2</sub>	%	-	3.0	-	2.9	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES	Arrived at site 0700. Tailgate safety meeting. Maked unit and positioned @ VG-4. Engaged VG-4. No NAPL. Event start @ 0730. Gradually ↑ well vac & flow. EGT @ 10.5 initially ↓ ambient air						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL	-				
	Extraction Well	DTGW	67.94				

T.D = 72.32' 0.00



OPERATING DATA - EVENT # 10A

PAGE # 2

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well # VG-4	Date	5/16/22					
	Time	1030	1100	1130	1200	1230	1300
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	145	145	150	150	150
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	17	17	17	17	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	60	60	60
	Extraction Well Flow	scfm	18.53	20.18	20.18	20.14	20.14
	Well Flow Ref Number		22	24	24	24	24
	Influent Vapor Temp.	°F	70	72	72	74	74
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	75	77	79	81	84
	Barometric Pressure	In Hg	29.70	29.70	29.82	30.12	30.12
	Absolute Pressure	In Hg	26.13	26.13	26.12	26.10	26.09
VAPOR / INFLUENT	TPH	ppmv	-	7360	-	6920	-
	CO <sub>2</sub>	%	-	12.98	-	12.70	-
	O <sub>2</sub>	%	-	2.8	-	3.0	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # 10A

PAGE # 3

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	5/16/22					
	Time	1330	1400	1430	1500	1530	
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	150	155	160	160	160
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	60	60	60
	Extraction Well Flow	scfm	20.11	20.07	20.07	20.05	20.05
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	76	78	78	79	79
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	88	89	92	94	95
	Barometric Pressure	In Hg	30.10	30.08	30.06	30.04	30.04
	Absolute Pressure	In Hg	26.06	26.05	26.03	26.01	26.01
VAPOR / INFLUENT	TPH	ppmv	-	7390	-	7450	-
	CO <sub>2</sub>	%	-	12.66	-	12.88	-
	O <sub>2</sub>	%	-	2.7	-	2.9	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # 108

PAGE # 1

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	5/17/22					
	Time	0730	0800	0830	0900	0930	1000
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	145	145	150	150	155
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	60	60	60
	Extraction Well Flow	scfm	20.30	20.26	20.26	20.22	20.18
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	66	68	68	70	72
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	76	78	80	81	83
	Barometric Pressure	In Hg	30.03	30.03	30.04	30.04	30.04
	Absolute Pressure	In Hg	26.00	26.00	26.01	26.01	26.01
VAPOR / INFLUENT	TPH	ppmv	-	6910	-	6940	-
	CO <sub>2</sub>	%	-	12.54	-	12.36	-
	O <sub>2</sub>	%	-	2.9	-	3.2	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES	Arrived at site 0715, system ran over night, Tailgate safety meeting, Event start 0730, Initial TPH = 6910 ppm + 6940 ppm, clear to partly cloudy w/ high temp, expected 100°F today.						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # 108

PAGE # 2

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	5/17/22					
	Time	1030	1100	1130	1200	1230	1300
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	155	155	160	160	160
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	60	60	60
	Extraction Well Flow	scfm	20.14	20.13	20.13	20.09	20.07
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	74	75	75	77	78
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	86	88	90	93	94
	Barometric Pressure	In Hg	30.03	30.02	30.02	30.01	30.00
	Absolute Pressure	In Hg	26.00	26.00	25.99	25.99	25.98
VAPOR / INFLUENT	TPH	ppmv	-	7240	-	7260	-
	CO <sub>2</sub>	%	-	12.56	-	12.60	-
	O <sub>2</sub>	%	-	2.9	-	3.0	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # 103

PAGE # 3

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	5/17/22					
	Time	1330	1400	1430	1500	1530	
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	160	160	160	160	160
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	60	60	60
	Extraction Well Flow	scfm	20.05	20.05	20.05	20.03	20.03
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	79	79	79	80	80
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	97	98	98	99	99
	Barometric Pressure	In Hg	29.98	29.97	29.97	29.96	29.96
	Absolute Pressure	In Hg	25.96	25.95	25.95	25.94	25.94
VAPOR / INFLUENT	TPH	ppmv	-	6850	-	7350	-
	CO <sub>2</sub>	%	-	12.10	-	12.72	-
	O <sub>2</sub>	%	-	3.4	-	3.1	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES	Event end @ 1530. Left system running over-night.						
	HR meter = 10260						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # 10C

PAGE # 1

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	5/18/22					
	Time	0730	0800	0830	0900	0930	1000
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	145	145	155	155	160
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	60	60	60
	Extraction Well Flow	scfm	20.34	20.34	20.30	20.26	20.22
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	64	64	66	68	70
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	71	71	75	78	80
	Barometric Pressure	In Hg	30.05	30.05	30.06	30.07	30.08
	Absolute Pressure	In Hg	26.02	26.02	26.03	26.04	26.05
VAPOR / INFLUENT	TPH	ppmv	-	6640	-	6680	-
	CO <sub>2</sub>	%	-	12.08	-	12.06	-
	O <sub>2</sub>	%	-	3.4	-	3.1	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES	Arrived at site 0710. Tail gate safety meeting. Event start @ 0730.						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # 106

PAGE # 2

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	5/18/22					
	Time	1030	1100	1130	1200	1230	1300
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	160	160	160	160	160
	Alternator	volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	60	60	60
	Extraction Well Flow	scfm	20.18	20.16	20.13	20.11	20.09
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	72	73	75	76	77
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	82	84	86	87	88
	Barometric Pressure	In Hg	30.08	30.08	30.07	30.07	30.05
	Absolute Pressure	In Hg	26.05	26.05	26.04	26.04	30.02
VAPOR / INFLUENT	TPH	ppmv	-	6730	-	6970	-
	CO <sub>2</sub>	%	-	12.02	-	12.12	-
	O <sub>2</sub>	%	-	3.3	-	3.2	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # 10C

PAGE # 3

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	5/18/22					
	Time	1330	1400	1430	1500	1530	
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1700	1700
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	160	160	160	175	175
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	60	60	60
	Extraction Well Flow	scfm	20.07	20.07	20.05	20.05	20.05
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	78	78	79	79	79
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	93	95	96	96	97
	Barometric Pressure	In Hg	30.04	30.03	30.01	30.00	30.00
	Absolute Pressure	In Hg	26.01	26.00	25.99	25.98	25.98
VAPOR / INFLUENT	TPH	ppmv	-	7030	-	6810	-
	CO <sub>2</sub>	%	-	11.62	-	11.66	-
	O <sub>2</sub>	%	-	3.7	-	3.2	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES	water temp ↑ to 175°, Dropped RPM to 1700, Temp went to 180°F then ↓ to 170°F						
	HR. Meter = 10284, Event stop @ 1530.						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # 101

PAGE # 1

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	5/19/22					
	Time	0730	0800	0830	0900	0930	1000
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1700	1700	1700	1700	1700
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	160	160	165	165	170
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	60	60	60
	Extraction Well Flow	scfm	20.30	20.30	20.26	20.26	20.22
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	66	66	68	68	70
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	72	74	78	80	82
	Barometric Pressure	In Hg	29.96	29.96	29.96	29.96	29.95
	Absolute Pressure	In Hg	25.94	25.94	25.94	25.94	25.93
VAPOR / INFLUENT	TPH	ppmv	-	6350	-	6560	-
	CO <sub>2</sub>	%	-	11.08	-	11.76	-
	O <sub>2</sub>	%	-	4.0	-	3.4	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES	Arrived at site 0710. Tailgate safety meeting. Event started at 0730.						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	5/19/22					
	Time	1030	1100	1130	1200	1230	1300
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1700	1700	1700	1700	1700
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	165	160	160	160	160
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	60	60	60
	Extraction Well Flow	scfm	20.14	20.14	20.11	20.11	20.07
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	74	74	76	76	78
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	88	90	92	94	95
	Barometric Pressure	In Hg	29.93	29.93	29.92	29.90	29.88
	Absolute Pressure	In Hg	25.92	25.92	25.91	25.89	25.88
VAPOR / INFLUENT	TPH	ppmv	-	6970	-	7240	-
	CO <sub>2</sub>	%	-	12.04	-	11.82	-
	O <sub>2</sub>	%	-	3.0	-	2.7	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi	-	-	-	-	-
	EVR Flow	cfh	-	-	-	-	-
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well #	Date	5/19/22					
	Time	1330	1400	1430	1500	1530	
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1700	1700	1700	1700	1700
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	160	160	160	160	160
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	60	60	60	60	60
	Extraction Well Flow	scfm	20.07	20.05	20.05	20.03	20.03
	Well Flow Ref Number		24	24	24	24	24
	Influent Vapor Temp.	°F	78	79	79	80	80
	Groundwater Temp.	°F	—	—	—	—	—
	Air Temp	°F	95	96	96	97	98
	Barometric Pressure	In Hg	29.84	29.82	29.81	29.80	29.79
	Absolute Pressure	In Hg	25.84	25.82	25.81	25.80	25.79
VAPOR / INFLUENT	TPH	ppmv	—	6740	—	6860	—
	CO <sub>2</sub>	%	—	10.46	—	11.66	—
	O <sub>2</sub>	%	—	3.9	—	3.8	—
	H <sub>2</sub> S	ppm	—	—	—	—	—
EVR	EVR Pressure	psi	—	—	—	—	—
	EVR Flow	cfh	—	—	—	—	—
NOTES	Event stop @ 1530. HR Meter = 10308.						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # *10E*

PAGE # 1

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George				
Well # <i>VG-4</i>	Date	<i>5/22/22</i>					
	Time	<i>0730</i>	<i>0800</i>	<i>0830</i>	<i>0900</i>	<i>0930</i>	<i>1000</i>
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	<i>1700</i>	<i>1700</i>	<i>1700</i>	<i>1700</i>	<i>1700</i>
	Oil Pressure	psi	<i>55</i>	<i>55</i>	<i>55</i>	<i>55</i>	<i>55</i>
	Water Temp	°F	<i>160</i>	<i>160</i>	<i>150</i>	<i>150</i>	<i>150</i>
	Alternator	Volts	<i>14</i>	<i>14</i>	<i>14</i>	<i>14</i>	<i>14</i>
	Intake Vacuum	"Hg	<i>16</i>	<i>16</i>	<i>16</i>	<i>16</i>	<i>16</i>
	Gas Flow Fuel/Propane	cfh	<i>110</i>	<i>110</i>	<i>110</i>	<i>110</i>	<i>110</i>
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	<i>60</i>	<i>60</i>	<i>60</i>	<i>60</i>	<i>60</i>
	Extraction Well Flow	scfm	<i>20.30</i>	<i>20.30</i>	<i>20.26</i>	<i>20.22</i>	<i>20.18</i>
	Well Flow Ref Number		<i>24</i>	<i>24</i>	<i>24</i>	<i>24</i>	<i>24</i>
	Influent Vapor Temp.	°F	<i>66</i>	<i>66</i>	<i>68</i>	<i>70</i>	<i>72</i>
	Groundwater Temp.	°F	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
	Air Temp	°F	<i>75</i>	<i>77</i>	<i>80</i>	<i>83</i>	<i>85</i>
	Barometric Pressure	In Hg	<i>29.77</i>	<i>29.77</i>	<i>29.77</i>	<i>29.77</i>	<i>29.78</i>
	Absolute Pressure	In Hg	<i>25.78</i>	<i>25.78</i>	<i>25.78</i>	<i>25.78</i>	<i>25.78</i>
VAPOR / INFLUENT	TPH	ppmv	<i>-</i>	<i>6410</i>	<i>-</i>	<i>6780</i>	<i>-</i>
	CO <sub>2</sub>	%	<i>-</i>	<i>11.40</i>	<i>-</i>	<i>11.28</i>	<i>-</i>
	O <sub>2</sub>	%	<i>-</i>	<i>3.8</i>	<i>-</i>	<i>3.3</i>	<i>-</i>
	H <sub>2</sub> S	ppm	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
EVR	EVR Pressure	psi	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
	EVR Flow	cfh	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
NOTES	<i>Arrived @ site 0715. Tail gate safety meeting.</i>						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Hendley / George			
Well #	Date	<i>5/20/22</i>				
	Time	<i>1030</i>	<i>1100</i>	<i>1130</i>		
	Hr Meter					
ENGINE / BLOWER	Engine Speed	RPM	<i>1700</i>	<i>1700</i>	<i>1700</i>	
	Oil Pressure	psi	<i>55</i>	<i>55</i>	<i>55</i>	
	Water Temp	°F	<i>150</i>	<i>150</i>	<i>150</i>	
	Alternator	Volts	<i>14</i>	<i>14</i>	<i>14</i>	
	Intake Vacuum	"Hg	<i>16</i>	<i>16</i>	<i>16</i>	
	Gas Flow Fuel/Propane	cfh	<i>110</i>	<i>110</i>	<i>110</i>	
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	<i>60</i>	<i>60</i>	<i>60</i>	
	Extraction Well Flow	scfm	<i>20.14</i>	<i>20.14</i>	<i>20.13</i>	
	Well Flow Ref Number		<i>24</i>	<i>24</i>	<i>24</i>	
	Influent Vapor Temp.	°F	<i>74</i>	<i>74</i>	<i>75</i>	
	Groundwater Temp.	°F	<i>—</i>	<i>—</i>	<i>—</i>	
	Air Temp	°F	<i>86</i>	<i>89</i>	<i>90</i>	
	Barometric Pressure	In Hg	<i>29.77</i>	<i>29.77</i>	<i>29.77</i>	
	Absolute Pressure	In Hg	<i>25.77</i>	<i>25.77</i>	<i>25.77</i>	
VAPOR / INFLUENT	TPH	ppmv	<i>—</i>	<i>6780</i>	<i>—</i>	
	CO <sub>2</sub>	%	<i>—</i>	<i>11.48</i>	<i>—</i>	
	O <sub>2</sub>	%	<i>—</i>	<i>3.8</i>	<i>—</i>	
	H <sub>2</sub> S	ppm	<i>—</i>	<i>—</i>	<i>—</i>	
EVR	EVR Pressure	psi	<i>—</i>	<i>—</i>	<i>—</i>	
	EVR Flow	cfh	<i>—</i>	<i>—</i>	<i>—</i>	
NOTES	<i>Event end @ 1130, total event time = 100 hours, steady drop in average TPH during event</i>					
RECOVERY	Totalizer	gals				
	Pump Rate	gals/min				
	Total Volume	gals				
	NAPL	% Vol				
	NAPL	Gals				
EW	Data Logger Head	ft				
	GW Depression	ft				
	Extraction Well	DTNAPL				
	Extraction Well	DTGW				



November 23, 2022

Mr. Chuck Terhune, PG  
 Project Manager  
 Tetra Tech  
 2500 City West Blvd, Suite 1000  
 Houston, TX 77042

Dear Chuck:

Re: Vacuum Glorietta Site, Lea County, NM, (Event #11)

At your request, AcuVac Remediation, LLC (AcuVac) performed ) performed a single continuous one hundred (100.0) hour Soil Vapor Extraction (SVE) Events: #11A, #11B, #11C, #11D and #11E at the above referenced site as outlined in the table below. The following is the report and a copy of the operating data collected during Event #11. Additionally, the attached Table #1 contains the Summary Well Data, and Table #2 contains the Summary Recovery Data.

Event Number	Well Number	Event Type	Event Duration (hrs)	Date
#11A	VG-4	SVE	24.0	11/07/2022
#11B	VG-4	SVE	24.0	11/08/2022
#11C	VG-4	SVE	24.0	11/09/2022
#11D	VG-4	SVE	24.0	11/10/2022
#11E	VG-4	SVE	4.0	11/11/2022

The event hours for each day are based on the start time of the event 0800 hrs. and ending at 0800 hrs. on the following day.

The purpose of the events was to enhance recovery of phase separated hydrocarbons (PSH) present at the Site through the removal of petroleum hydrocarbons in both liquid and vapor phases. PSH refers to both petroleum hydrocarbons and Non-Aqueous Phase Liquids (NAPL). The source of the PSH is a historical pipeline release.

## OBJECTIVES

The objectives of the SVE Events:

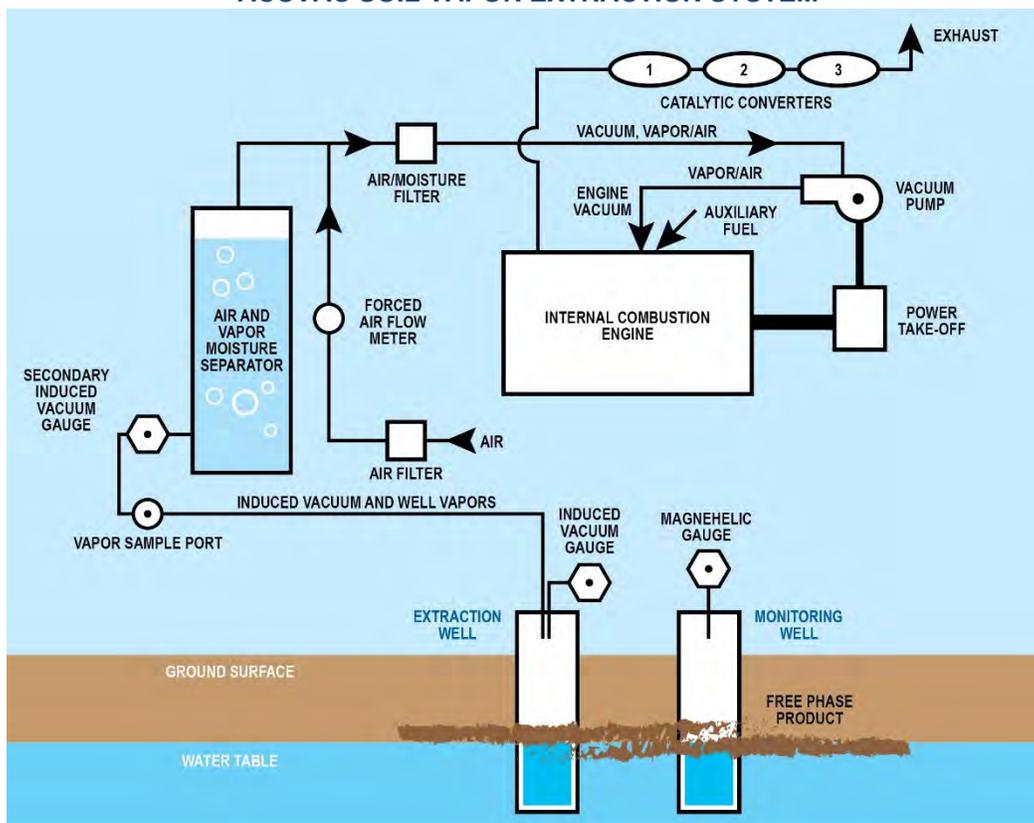
- Maximize liquid and vapor phase petroleum hydrocarbon removal from groundwater and soils in the subsurface formations within the influence of the extraction well.
- Expose the capillary fringe area and below to the extraction well induced vacuums.
- Increase the liquid and vapor phase petroleum hydrocarbon specific yields with high induced vacuums.

**METHODS AND EQUIPMENT**

AcuVac owns and maintains an inventory of equipment to perform SVE events and uses no third-party equipment. The events at the Site were conducted using the AcuVac I-6 System (System) with a Roots RAI-33 blower, used as a vacuum pump, and a Roots RAI-22 positive displacement blower. The table below lists additional equipment and instrumentation employed, and the data element captured by each.

Equipment and Instrumentation Employed by AcuVac	
Measurement Equipment	Data Element
<b>Extraction Well Induced Vacuum and Flow</b>	
Dwyer Magnehelic Gauges	Extraction Well Vacuum
Dwyer Averaging Pitot Tubes / Magnehelic Gauges	Extraction Well Vapor Flow
<b>Observation Wells</b>	
Dwyer Digital Manometer	Vacuum / Pressure Influence
<b>Extraction Well Vapor Monitoring</b>	
AcuVac V-1 Vacuum Box	Extraction Well Non-Diluted Vapor Sample Collection
HORIBA® Analyzer	Extraction Well Vapor TPH Concentration
RKI 1200 O <sub>2</sub> Monitor	Extraction Well Vapor Oxygen Content
<b>NAPL Thickness (if present)</b>	
Solinst Interface Probes Model 122	Depth to LNAPL and Depth to Groundwater
<b>Atmospheric Conditions</b>	
Testo Model 511	Relative and Absolute Barometric Pressure

**ACUVAC SOIL VAPOR EXTRACTION SYSTEM**



The vacuum extraction portion of the System consists of a vacuum pump driven by an internal combustion engine (IC engine). The vacuum pump connects to the extraction well, and the vacuum created on the extraction well causes light hydrocarbons in the soil and in the groundwater to volatilize and flow through a moisture knockout tank to the vacuum pump and the IC engine where they burn as part of the normal combustion process. Auxiliary propane powers the engine if the well vapors do not provide the required energy.

The IC engine provides the power necessary to achieve and maintain high induced vacuums and/or high well vapor flows needed to maximize the vacuum radius of influence.

Emissions from the engine pass through three catalytic converters to maximize destruction of effluent hydrocarbon vapors. The engine’s fuel-to-air ratio is adjusted to maintain efficient combustion. Because the engine powers all equipment, the System stops when the engine stops preventing an uncontrolled release of hydrocarbons. Since the System operates entirely under vacuum, any leaks in the seals or connections leak into the System and not the atmosphere. Vacuum loss, low oil pressure, over-speed, or overheating automatically shut down the engine.

The design of the AcuVac System enables independent control of both the induced well vacuum and the groundwater pumping functions such that the AcuVac team controls the induced hydraulic gradient to increase exposure of the formation to soil vapor extraction (SVE). The ability to separate the vapor and liquid flows within the extraction well improve the LNAPL recovery rates and enabled the AcuVac team to record data specific to each media.

**RECOVERY SUMMARY FOR SVE EVENT #11**

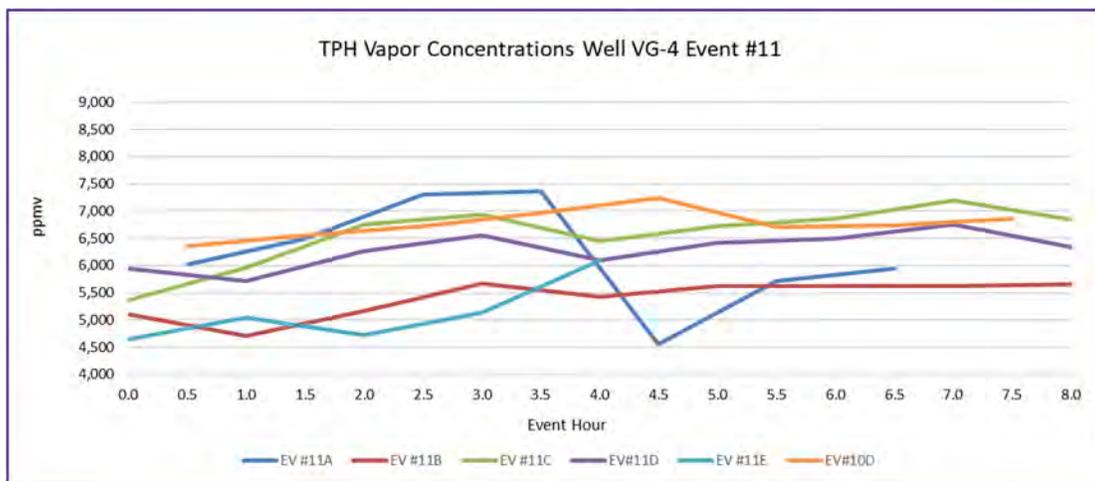
The Recovery Summary Table below lists the groundwater, liquid LNAPL, and PSH vapor recovery data for Event #11, on the dates shown.

Recovery Summary Well VG-4							
Event Number		Event #11A	Event #11B	Event #11C	Event #11D	Event #11E	Event #11
Event Date		11/07/2022	11/08/2022	11/09/2022	11/10/2022	11/11/2022	Total
Event Hours		24.0	24.0	24.0	24.0	4.0	100.0
<b>Data Element</b>							
Groundwater Recovery	gals	0	0	0	0	0	0
<b>LNAPL Recovery</b>							
Liquid	gals	0	0	0	0	0	0
Vapor	gals	4.47	4.46	5.11	4.50	0.65	19.19
Total	gals	4.47	4.46	5.11	4.50	0.65	19.19
Gallons/Hour	gph	0.19	0.19	0.21	0.19	0.16	0.19

- Total vapor hydrocarbons burned as IC engine fuel in the Recovery Summary Table above are based on the HORIBA® data recorded in the Influent Vapor Data Table shown.

Influent Vapor Data Well VG-4						
Event Number		Event #11A	Event #11B	Event #11C	Event #11D	Event #11E
Event Date		11/07/2022	11/08/2022	11/09/2022	11/10/2022	11/11/2022
Event Hours		24.0	24.0	24.0	24.0	4.0
Data Element						
TPH- Maximum	ppmv	7,370	5,670	7,200	6,760	6,090
TPH- Average	ppmv	6,201	5,399	6,564	6,281	5,128
TPH- Minimum	ppmv	4,550	4,700	5,370	5,720	4,650
TPH- Initial	ppmv	6,020	5,100	5,370	5,940	4,650
TPH- Ending	ppmv	5,950	5,650	6,840	6,340	6,090
CO <sub>2</sub>	%	12.96	9.54	11.51	11.49	10.11
O <sub>2</sub>	%	3.7	6.1	3.2	3.2	5.5

- The TPH vapor concentrations from the influent vapor samples for Event #11 are presented in the following graph.



- The extraction well induced vacuum and well vapor flow for Event #11 are presented in the following table.

Well Vacuum and Well Vapor Flow						
Well VG-4						
Event Number		Event #11A	Event #11B	Event #11C	Event #11D	Event #11E
Event Date		11/07/2022	11/08/2022	11/09/2022	11/10/2022	11/11/2022
Event Hours		24.0	24.0	24.0	24.0	4.0
Data Element						
Well Vacuum- Maximum	InH <sub>2</sub> O	52.00	56.00	56.00	56.00	54.00
Well Vacuum- Average	InH <sub>2</sub> O	44.80	54.12	55.41	56.00	54.00
Well Vacuum- Minimum	InH <sub>2</sub> O	21.00	52.00	54.00	56.00	54.00
Well Vapor Flow- Maximum	scfm	15.39	16.12	15.35	15.35	14.63
Well Vapor Flow- Average	scfm	14.21	15.69	15.26	15.27	14.61
Well Vapor Flow- Minimum	scfm	10.84	15.30	15.20	15.22	14.58

- The LNAPL thickness recorded at the start and conclusion of Event #11 is contained in the following table.

LNAPL Thickness Data			
Well VG-4			
Event Number		Event #11A	Event #11E
Event Date		11/07/2022	11/11/2022
Event Hours		24.0	4.0
Event Start			
Depth to Groundwater	Ft BTOC	67.94	NM
Depth to LNAPL	Ft BTOC	-	-
LNAPL Thickness	ft	-	-
Hydro Equivalent	Ft BTOC	67.94	NM
Event Conclusion			
Depth to Groundwater	Ft BTOC	NM	67.42
Depth to LNAPL	Ft BTOC	-	-
LNAPL Thickness	ft	-	-
Hydro Equivalent	Ft BTOC	NM	67.42

NM- Not Measured

**ADDITIONAL INFORMATION**

- All LNAPL volume recovered, 19.19 gals, was burned as IC engine fuel. The LNAPL weighted recovery rate for Event #11 was 0.19 gals/hour.

**METHOD OF CALIBRATION AND CALCULATIONS**

The HORIBA® Analytical instrument is calibrated with Hexane and CO<sub>2</sub> in accordance with the manufacturer’s specifications.

The formula used to calculate the emission rate is:

$$ER = HC \text{ (ppmv)} \times MW \text{ (Hexane)} \times \text{Flow Rate (scfm)} \times 1.58E^{-7} \frac{\text{(min)}(\text{lb mole})}{\text{(hr)}(\text{ppmv})(\text{ft}^3)} = \text{lbs/hr}$$

**INFORMATION INCLUDED WITH REPORT**

- Table #1 Summary Well Data
- Table #2 Summary Recovery Data
- Recorded Data

After you have reviewed the report and if you have any questions, please contact me. We appreciate you selecting AcuVac to provide these services.

Sincerely,  
ACUVAC REMEDIATION, LLC



Paul D. Faucher  
President

**Summary Well Data  
Table #1**

Event		11A	11B	11C	11D	11E
WELL NO.		VG-4	VG-4	VG-4	VG-4	VG-4
Current Event Hours		24.0	24.0	24.0	24.0	4.0
Total Event Hours		463.0	487.0	511.0	535.0	539.0
TD (estimated)	ft BGS	73.8	73.8	73.8	73.8	73.8
Well Screen	ft BGS	unknown	unknown	unknown	unknown	unknown
Well Size	in	4.0	4.0	4.0	4.0	4.0
<b>Well Data</b>						
Depth to LNAPL - Static - Start Event	ft BTOC	-	NM	NM	NM	NM
Depth to Groundwater - Static - Start Event	ft BTOC	67.94	NM	NM	NM	NM
LNAPL Thickness	ft	-	-	-	-	-
Hydro-Equivalent- Beginning	ft BTOC	67.94	-	-	-	-
Depth to LNAPL - End Event	ft BTOC	NM	NM	NM	NM	-
Depth to Groundwater - End Event	ft BTOC	NM	NM	NM	NM	67.42
LNAPL Thickness	ft	-	-	-	-	-
Hydro-Equivalent- Ending	ft BTOC	-	-	-	-	67.42
<b>Extraction Data</b>						
Maximum Extraction Well Vacuum	InH <sub>2</sub> O	52.00	56.00	56.00	56.00	54.00
Average Extraction Well Vacuum	InH <sub>2</sub> O	44.80	54.12	55.41	56.00	54.00
Minimum Extraction Well Vacuum	InH <sub>2</sub> O	21.00	52.00	54.00	56.00	54.00
Maximum Extraction Well Vapor Flow	scfm	15.39	16.12	15.35	15.35	14.63
Average Extraction Well Vapor Flow	scfm	14.21	15.69	15.26	15.27	14.61
Minimum Extraction Well Vapor Flow	scfm	10.84	15.30	15.20	15.22	14.58
<b>Influent Data</b>						
Maximum TPH	ppmv	7,370	5,670	7,200	6,760	6,090
Average TPH	ppmv	6,201	5,399	6,564	6,281	5,128
Maximum TPH	ppmv	4,550	4,700	5,370	5,720	4,650
Initial TPH	ppmv	6,020	5,100	5,370	5,940	4,650
Final TPH	ppmv	5,950	5,650	6,840	6,340	6,090
Average CO <sub>2</sub>	%	12.96	9.54	11.51	11.49	10.11
Average O <sub>2</sub>	%	3.7	6.1	3.2	3.2	5.5

**Summary Recovery Data  
Table #2**

Event		11A	11B	11C	11D	11E
WELL NO.		VG-4	VG-4	VG-4	VG-4	VG-4
<b>Recovery Data- Current Event</b>						
Total Liquid Volume Recovered	gals	-	-	-	-	-
Total Liquid LNAPL Recovered	gals	-	-	-	-	-
Total Liquid LNAPL Recovered / Total Liquid	%	-	-	-	-	-
Total Liquid LNAPL Recovered / Total LNAPL	%	-	-	-	-	-
Total Vapor LNAPL Recovered	gals	4.47	4.46	5.11	4.50	0.65
Total Vapor LNAPL Recovered / Total LNAPL	%	100.00	100.00	100.00	100.00	100.00
Total Vapor and Liquid LNAPL Recovered	gals	4.47	4.46	5.11	4.50	0.65
Average LNAPL Recovery	gals/hr	0.19	0.19	0.21	0.19	0.16
Total LNAPL Recovered	lbs	31.29	31.22	35.77	31.50	4.55
Total Volume of Well Vapors	cu. ft	20,462	22,594	21,974	21,989	3,506
<b>Recovery Data- Cumulative</b>						
Total Liquid Volume Recovered	gals	27,394	27,394	27,394	27,394	27,394
Total Liquid LNAPL Recovered	gals	7.99	7.99	7.99	7.99	7.99
Total Vapor LNAPL Recovered	gals	43.07	47.53	52.64	57.14	57.79
Total Vapor and Liquid LNAPL Recovered	gals	51.06	55.52	60.63	65.13	65.78
Average LNAPL Recovery	gals/hr	0.11	0.11	0.12	0.12	0.16
Total LNAPL Recovered	lbs	1,858	1,889	1,925	1,956	1,961
Total Volume of Well Vapors	cu. ft	509,293	531,886	553,861	575,849	579,356



OPERATING DATA - EVENT # 11A

PAGE # 1

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM

Project Managers: Vasquez / George

Well #	Date	Time	Hr Meter					
				1030	1100	1130	1200	1230
ENGINE / BLOWER	Engine Speed	RPM	1800	1900	1900	1900	1900	
	Oil Pressure	psi	55	55	55	55	55	
	Water Temp	°F	130	135	135	135	140	
	Alternator	Volts	14	14	14	14	14	
	Intake Vacuum	"Hg	18	18	17	18	18	
	Gas Flow Fuel/Propane	cfh	120	140	140	140	140	
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	21	41	41	36	36	
	Extraction Well Flow	scfm	10.84	1396	1309	12.29	12.28	
	Well Flow Ref Number		12	16	15	14	14	
	Influent Vapor Temp.	°F	62	66	66	68	69	
	Groundwater Temp.	°F	-	-	-	-	-	
	Air Temp	°F	57	60	63	63	66	
	Barometric Pressure	In Hg	30.33	30.31	30.31	30.30	30.28	
	Absolute Pressure	In Hg	2626	2625	2625	2624	2621	
VAPOR / INFLUENT	TPH	ppmv	-	6020	-	6500	-	
	CO <sub>2</sub>	%	-	12.30	-	11.22	-	
	O <sub>2</sub>	%	-	4.5	-	4.2	-	
	H <sub>2</sub> S	ppm	-	-	-	-	-	
EVR	EVR Pressure	psi						
	EVR Flow	cfh						
NOTES	Arrived at site at 8:40 after Training							
	Tail gate safety, started event at 10:00							
RECOVERY	Totalizer	gals						
	Pump Rate	gals/min						
	Total Volume	gals						
	NAPL	% Vol						
	NAPL	Gals						
EW	Data Logger Head	ft						
	GW Depression	ft						
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						

TD = 72.32' DTP - 68.20 DTW - 68.27



OPERATING DATA - EVENT # **11A**

PAGE # **2**

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Vasquez / George				
Well #	Date						
	Time	1300	1330	1400	1430	1500	1530
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1900	1900	1900	1900	1900
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	140	140	140	140	140
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	18	17	17	17	17
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	50	50	52	51	51
	Extraction Well Flow	scfm	15.39	15.39	15.37	15.39	15.39
	Well Flow Ref Number		18	18	18	18	18
	Influent Vapor Temp.	°F	72	72	70	70	70
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	67	67	68	69	70
	Barometric Pressure	In Hg	30.23	30.22	30.22	30.21	30.21
	Absolute Pressure	In Hg	26.18	26.17	26.16	26.16	26.15
VAPOR / INFLUENT	TPH	ppmv	-	7370	-	4550	-
	CO <sub>2</sub>	%	-	12.60	-	11.70	-
	O <sub>2</sub>	%	-	2.8	-	2.9	-
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi					
	EVR Flow	cfh					
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # *11A*

PAGE # *3*

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Vasquez / George			
Well #	Date	<i>11/7/22</i>				
	Time	<i>1600</i>	<i>1630</i>	<i>1700</i>	<i>1730</i>	
	Hr Meter			<i>10932.9</i>		
ENGINE / BLOWER	Engine Speed	RPM	<i>1900</i>	<i>1900</i>	<i>1900</i>	
	Oil Pressure	psi	<i>55</i>	<i>55</i>	<i>55</i>	
	Water Temp	°F	<i>140</i>	<i>140</i>	<i>140</i>	
	Alternator	Volts	<i>14</i>	<i>14</i>	<i>14</i>	
	Intake Vacuum	"Hg	<i>17</i>	<i>17</i>	<i>17</i>	
	Gas Flow Fuel/Propane	cfh	<i>110</i>	<i>110</i>	<i>110</i>	
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	<i>51</i>	<i>52</i>	<i>52</i>	
	Extraction Well Flow	scfm	<i>15.37</i>	<i>15.37</i>	<i>15.37</i>	
	Well Flow Ref Number		<i>18</i>	<i>18</i>	<i>18</i>	
	Influent Vapor Temp.	°F	<i>70</i>	<i>70</i>	<i>70</i>	
	Groundwater Temp.	°F	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
	Air Temp	°F	<i>69</i>	<i>69</i>	<i>69</i>	
	Barometric Pressure	In Hg	<i>30.21</i>	<i>30.21</i>	<i>30.21</i>	
	Absolute Pressure	In Hg	<i>26.16</i>	<i>26.15</i>	<i>26.16</i>	
VAPOR / INFLUENT	TPH	ppmv	<i>-</i>	<i>5950</i>	<i>-</i>	
	CO <sub>2</sub>	%	<i>-</i>	<i>15.0</i>	<i>-</i>	
	O <sub>2</sub>	%	<i>-</i>	<i>4.3</i>	<i>-</i>	
	H <sub>2</sub> S	ppm	<i>-</i>	<i>-</i>	<i>-</i>	
EVR	EVR Pressure	psi				
	EVR Flow	cfh				
NOTES						
RECOVERY	Totalizer	gals				
	Pump Rate	gals/min				
	Total Volume	gals				
	NAPL	% Vol				
	NAPL	Gals				
EW	Data Logger Head	ft				
	GW Depression	ft				
	Extraction Well	DTNAPL				
	Extraction Well	DTGW				



OPERATING DATA - EVENT # **11B**

PAGE # **1**

ACUVAC MDPE SYSTEM

Location: **Vacuum Glorietta Site, Lea County, NM**

Project Managers: **Vasquez / George**

elev 2942

Well #	Date	Time	Hr Meter					
			0800	0830	0900	0930	1000	1030
V6-4	Engine Speed	RPM	1700	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55	55
	Water Temp	°F	140	140	140	140	140	140
	Alternator	Volts	14	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	52	52	54	54	52	52
	Extraction Well Flow	scfm	15.43	15.43	15.40	15.37	15.37	15.37
	Well Flow Ref Number		18	18	18	18	18	18
	Influent Vapor Temp.	°F	66	66	68	70	70	70
	Groundwater Temp.	°F	-	-	-	-	-	-
	Air Temp	°F	65	64	64	62	67	67
	Barometric Pressure	In Hg	30.08	30.12	30.09	30.09	30.02	30.06
	Absolute Pressure	In Hg	26.27	26.22	26.23	26.22	26.20	26.20
VAPOR / INFLUENT	TPH	ppmv	5100	-	4700	-	5170	-
	CO <sub>2</sub>	%	9.72	-	8.90	-	9.20	-
	O <sub>2</sub>	%	7.1	-	6.4	-	5.8	-
	H <sub>2</sub> S	ppm	-	-	-	-	-	-
EVR	EVR Pressure	psi						
	EVR Flow	cfh						
NOTES	Arrived on site at 7:45							
	Takegate safety meeting							
	Started at 8:00							
RECOVERY	Totalizer	gals						
	Pump Rate	gals/min						
	Total Volume	gals						
	NAPL	% Vol						
	NAPL	Gals						
EW	Data Logger Head	ft						
	GW Depression	ft						
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						



Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Vasquez / George				
Well #	Date	11-8-22					
	Time	1100	1130	1200	1230	1300	1330
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	140	140	140	140	140
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	54	54	54	54	56
	Extraction Well Flow	scfm	15.32	15.32	15.30	16.12	16.06
	Well Flow Ref Number		18	18	18	18	19
	Influent Vapor Temp.	°F	72	72	72	72	74
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	70	70	71	73	74
	Barometric Pressure	In Hg	30.12	30.09	30.09	30.06	30.05
	Absolute Pressure	In Hg	26.18	26.19	26.18	26.16	26.15
VAPOR / INFLUENT	TPH	ppmv	5670	-	5420	-	5620
	CO <sub>2</sub>	%	10.4	-	9.67	-	9.50
	O <sub>2</sub>	%	5.1	-	6.3	-	6.1
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi					
	EVR Flow	cfh					
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # **11B**

PAGE # **3**

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Vasquez / George				
Well #	Date	11-8-22					
	Time	1400	1430	1500	1530	1600	
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	140	140	140	140	140
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	110	110	110	110	110
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	56	56	56	56	56
	Extraction Well Flow	scfm	16.06	16.06	16.06	16.06	16.06
	Well Flow Ref Number		19	19	19	19	19
	Influent Vapor Temp.	°F	74	74	74	74	74
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	74	74	74	73	72
	Barometric Pressure	In Hg	30.02	30.01	30.01	30.01	30.01
	Absolute Pressure	In Hg	26.14	26.13	26.13	26.13	26.12
VAPOR / INFLUENT	TPH	ppmv	5630	-	5630	-	5650
	CO <sub>2</sub>	%	9.48	-	9.5	-	9.54
	O <sub>2</sub>	%	5.7	-	6.0	-	6.0
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi					
	EVR Flow	cfh					
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # *11C*

PAGE # *1*

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Vasquez / George					
Well #	Date	<i>11/9/22</i>						
	Time	<i>0800</i>	<i>0830</i>	<i>0900</i>	<i>0930</i>	<i>1000</i>	<i>1030</i>	
	Hr Meter							
ENGINE / BLOWER	Engine Speed	RPM	<i>1800</i>	<i>1800</i>	<i>1800</i>	<i>1800</i>	<i>1800</i>	
	Oil Pressure	psi	<i>55</i>	<i>55</i>	<i>55</i>	<i>55</i>	<i>55</i>	
	Water Temp	°F	<i>140</i>	<i>140</i>	<i>140</i>	<i>140</i>	<i>140</i>	
	Alternator	Volts	<i>14</i>	<i>14</i>	<i>14</i>	<i>14</i>	<i>14</i>	
	Intake Vacuum	"Hg	<i>16</i>	<i>16</i>	<i>16</i>	<i>16</i>	<i>16</i>	
	Gas Flow Fuel/Propane	cfh	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>	
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	<i>56</i>	<i>56</i>	<i>56</i>	<i>56</i>	<i>56</i>	
	Extraction Well Flow	scfm	<i>15.35</i>	<i>15.35</i>	<i>15.33</i>	<i>15.30</i>	<i>15.27</i>	
	Well Flow Ref Number		<i>18</i>	<i>18</i>	<i>18</i>	<i>18</i>	<i>18</i>	
	Influent Vapor Temp.	°F	<i>66</i>	<i>66</i>	<i>68</i>	<i>70</i>	<i>72</i>	
	Groundwater Temp.	°F	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	
	Air Temp	°F	<i>59</i>	<i>63</i>	<i>65</i>	<i>67</i>	<i>69</i>	<i>72</i>
	Barometric Pressure	In Hg	<i>29.92</i>	<i>29.97</i>	<i>29.96</i>	<i>29.94</i>	<i>29.93</i>	<i>29.91</i>
	Absolute Pressure	In Hg	<i>26.09</i>	<i>26.07</i>	<i>26.07</i>	<i>26.06</i>	<i>26.06</i>	<i>26.06</i>
VAPOR / INFLUENT	TPH	ppmv	<i>5370</i>	<i>-</i>	<i>5960</i>	<i>-</i>	<i>6750</i>	<i>-</i>
	CO <sub>2</sub>	%	<i>10.0</i>	<i>-</i>	<i>12.02</i>	<i>-</i>	<i>11.84</i>	<i>-</i>
	O <sub>2</sub>	%	<i>5.0</i>	<i>-</i>	<i>3.3</i>	<i>-</i>	<i>2.8</i>	<i>-</i>
	H <sub>2</sub> S	ppm	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
EVR	EVR Pressure	psi						
	EVR Flow	cfh						
NOTES	<i>arrived on site at 7:45</i>							
	<i>Tailgate safety meeting</i>							
	<i>Started event at 8:00 am</i>							
RECOVERY	Totalizer	gals						
	Pump Rate	gals/min						
	Total Volume	gals						
	NAPL	% Vol						
	NAPL	Gals						
EW	Data Logger Head	ft						
	GW Depression	ft						
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						



OPERATING DATA - EVENT # *1K*

PAGE # *2*

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM

Project Managers: Vasquez / George

Well #	Date	Time	Hr Meter						
<i>V6-4</i>	<i>11/9/22</i>			<i>1100</i>	<i>1130</i>	<i>1200</i>	<i>1230</i>	<i>1300</i>	<i>1330</i>
ENGINE / BLOWER	Engine Speed	RPM		<i>1800</i>	<i>1800</i>	<i>1860</i>	<i>1800</i>	<i>1800</i>	<i>1800</i>
	Oil Pressure	psi		<i>55</i>	<i>55</i>	<i>55</i>	<i>55</i>	<i>55</i>	<i>55</i>
	Water Temp	°F		<i>140</i>	<i>140</i>	<i>140</i>	<i>140</i>	<i>140</i>	<i>140</i>
	Alternator	Volts		<i>14</i>	<i>14</i>	<i>14</i>	<i>14</i>	<i>14</i>	<i>14</i>
	Intake Vacuum	"Hg		<i>16</i>	<i>16</i>	<i>16</i>	<i>16</i>	<i>16</i>	<i>16</i>
	Gas Flow Fuel/Propane	cfh		<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O		<i>56</i>	<i>56</i>	<i>56</i>	<i>56</i>	<i>56</i>	<i>56</i>
	Extraction Well Flow	scfm		<i>15.24</i>	<i>15.22</i>	<i>15.22</i>	<i>15.21</i>	<i>15.20</i>	<i>15.20</i>
	Well Flow Ref Number			<i>18</i>	<i>18</i>	<i>18</i>	<i>18</i>	<i>18</i>	<i>18</i>
	Influent Vapor Temp.	°F		<i>72</i>	<i>73</i>	<i>73</i>	<i>74</i>	<i>74</i>	<i>75</i>
	Groundwater Temp.	°F		<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
	Air Temp	°F		<i>72</i>	<i>73</i>	<i>75</i>	<i>76</i>	<i>77</i>	<i>77</i>
	Barometric Pressure	In Hg		<i>29.87</i>	<i>29.81</i>	<i>29.79</i>	<i>29.77</i>	<i>29.77</i>	<i>29.76</i>
	Absolute Pressure	In Hg		<i>26.04</i>	<i>26.01</i>	<i>25.99</i>	<i>25.97</i>	<i>25.96</i>	<i>25.96</i>
VAPOR / INFLUENT	TPH	ppmv		<i>6930</i>	<i>-</i>	<i>6450</i>	<i>-</i>	<i>6720</i>	<i>-</i>
	CO <sub>2</sub>	%		<i>11.8</i>	<i>-</i>	<i>11.24</i>	<i>-</i>	<i>11.84</i>	<i>-</i>
	O <sub>2</sub>	%		<i>2.5</i>	<i>-</i>	<i>3.4</i>	<i>-</i>	<i>3.6</i>	<i>-</i>
	H <sub>2</sub> S	ppm		<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
EVR	EVR Pressure	psi							
	EVR Flow	cfh							
NOTES									
RECOVERY	Totalizer	gals							
	Pump Rate	gals/min							
	Total Volume	gals							
	NAPL	% Vol							
	NAPL	Gals							
EW	Data Logger Head	ft							
	GW Depression	ft							
	Extraction Well	DTNAPL							
	Extraction Well	DTGW							



OPERATING DATA - EVENT # *11C*

PAGE # *3*

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Vasquez / George				
Well #	Date	<i>11/9/22</i>					
	Time	<i>1400</i>	<i>1430</i>	<i>1500</i>	<i>1530</i>	<i>1600</i>	
	Hr Meter					<i>10980</i>	
ENGINE / BLOWER	Engine Speed	RPM	<i>1800</i>	<i>1800</i>	<i>1800</i>	<i>1800</i>	<i>1806</i>
	Oil Pressure	psi	<i>55</i>	<i>55</i>	<i>55</i>	<i>55</i>	<i>55</i>
	Water Temp	°F	<i>140</i>	<i>140</i>	<i>140</i>	<i>140</i>	<i>140</i>
	Alternator	Volts	<i>14</i>	<i>14</i>	<i>14</i>	<i>14</i>	<i>14</i>
	Intake Vacuum	"Hg	<i>16</i>	<i>16</i>	<i>16</i>	<i>16</i>	<i>16</i>
	Gas Flow Fuel/Propane	cfh	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>	<i>120</i>
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	<i>54</i>	<i>54</i>	<i>54</i>	<i>54</i>	<i>54</i>
	Extraction Well Flow	scfm	<i>15.25</i>	<i>15.25</i>	<i>15.25</i>	<i>15.25</i>	<i>15.25</i>
	Well Flow Ref Number		<i>18</i>	<i>18</i>	<i>18</i>	<i>18</i>	<i>18</i>
	Influent Vapor Temp.	°F	<i>75</i>	<i>75</i>	<i>75</i>	<i>75</i>	<i>75</i>
	Groundwater Temp.	°F	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
	Air Temp	°F	<i>78</i>	<i>78</i>	<i>79</i>	<i>78</i>	<i>78</i>
	Barometric Pressure	In Hg	<i>29.74</i>	<i>29.70</i>	<i>29.66</i>	<i>29.66</i>	<i>29.66</i>
	Absolute Pressure	In H <sub>2</sub> O	<i>25.95</i>	<i>25.95</i>	<i>25.94</i>	<i>25.93</i>	<i>25.92</i>
VAPOR / INFLUENT	TPH	ppmv	<i>6860</i>	<i>-</i>	<i>7200</i>	<i>-</i>	<i>6840</i>
	CO <sub>2</sub>	%	<i>11.88</i>	<i>-</i>	<i>11.70</i>	<i>-</i>	<i>11.26</i>
	O <sub>2</sub>	%	<i>2.8</i>	<i>-</i>	<i>2.8</i>	<i>-</i>	<i>3.4</i>
	H <sub>2</sub> S	ppm	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>
EVR	EVR Pressure	psi					
	EVR Flow	cfh					
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # 110

PAGE # 1

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Vasquez / George				
Well #	Date	11/10/22					
	Time	0800	0830	0900	0930	1000	1030
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	150	140	140	140	140
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	16	16	16	16	16
	Gas Flow Fuel/Propane	cfh	120	110	120	120	120
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	56	56	56	56	56
	Extraction Well Flow	scfm	15.35	15.35	15.35	15.35	15.35
	Well Flow Ref Number		18	15	14	15	14
	Influent Vapor Temp.	°F	64	64	64	64	68
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	57	60	62	61	62
	Barometric Pressure	In Hg	29.90	29.89	29.88	29.88	29.87
	Absolute Pressure	In Hg	25.98	25.99	26.06	26.06	26.00
VAPOR / INFLUENT	TPH	ppmv	5940	-	5720	-	6270
	CO <sub>2</sub>	%	11.34	-	10.60	-	11.56
	O <sub>2</sub>	%	3.6	-	4.2	-	3.1
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi					
	EVR Flow	cfh					
NOTES	arrived on site at 7:45						
	Tailgate safety meeting						
	Started event at 8:00 am						
	8:30 - adjusted unit <sup>Pressure</sup> to lower EGT - Vac and flow went down						
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # 11D

PAGE # 2

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Vasquez / George					
Well #	Date	11/12/22						
	Time	1100	1130	1200	1230	1300	1330	
	Hr Meter							
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800	
	Oil Pressure	psi	55	55	55	55	55	
	Water Temp	°F	140	140	140	140	140	
	Alternator	Volts	14	14	14	14	14	
	Intake Vacuum	"Hg	17	17	18	18	18	
	Gas Flow Fuel/Propane	cfh	120	120	120	120	120	
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	56	56	56	56	56	
	Extraction Well Flow	scfm	15.27	15.24	15.24	15.22	15.22	
	Well Flow Ref Number		14	14	12	12	12	
	Influent Vapor Temp.	°F	70	72	72	73	73	
	Groundwater Temp.	°F	-	-	-	-	-	
	Air Temp	°F	65	66	67	67	68	69
	Barometric Pressure	In Hg	29.85	29.82	29.80	29.79	29.75	29.71
	Absolute Pressure	In Hg	25.98	25.97	25.95	25.94	25.92	25.91
VAPOR / INFLUENT	TPH	ppmv	6560	-	6090	-	6410	-
	CO <sub>2</sub>	%	11.88	-	11.00	-	11.62	-
	O <sub>2</sub>	%	2.5	-	3.9	-	3.1	-
	H <sub>2</sub> S	ppm	-	-	-	-	-	-
EVR	EVR Pressure	psi						
	EVR Flow	cfh						
NOTES								
RECOVERY	Totalizer	gals						
	Pump Rate	gals/min						
	Total Volume	gals						
	NAPL	% Vol						
	NAPL	Gals						
EW	Data Logger Head	ft						
	GW Depression	ft						
	Extraction Well	DTNAPL						
	Extraction Well	DTGW						



OPERATING DATA - EVENT # 11D

PAGE # 3

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Vasquez / George				
Well #	Date	11-16-22					
	Time	1400	1430	1500	1530	1600	
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1800	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	140	140	140	140	140
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	18	18	18	18	18
	Gas Flow Fuel/Propane	cfh	120	120	120	120	120
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	56	56	56	56	56
	Extraction Well Flow	scfm	15.22	15.22	15.22	15.22	15.22
	Well Flow Ref Number		12	12	12	12	12
	Influent Vapor Temp.	°F	73	73	73	73	73
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	70	70	71	71	71
	Barometric Pressure	In Hg	29.70	29.68	29.67	29.66	29.65
	Absolute Pressure	In Hg	25.89	25.89	25.88	25.88	25.86
VAPOR / INFLUENT	TPH	ppmv	6500	-	6760	-	6340
	CO <sub>2</sub>	%	11.70	-	12.22	-	11.02
	O <sub>2</sub>	%	2.70	-	2.1	-	3.4
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi					
	EVR Flow	cfh					
NOTES							
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # 112

PAGE # 1

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Vasquez / George				
Well #	Date	11/6/22					
	Time	0800	0830	0900	0930	1000	1030
	Hr Meter						
ENGINE / BLOWER	Engine Speed	RPM	1800	1900	1800	1800	1800
	Oil Pressure	psi	55	55	55	55	55
	Water Temp	°F	130	130	130	130	130
	Alternator	Volts	14	14	14	14	14
	Intake Vacuum	"Hg	18	19	19	19	19
	Gas Flow Fuel/Propane	cfh	120	120	120	120	120
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	54	54	54	54	54
	Extraction Well Flow	scfm	14.63	14.63	14.63	14.61	14.62
	Well Flow Ref Number		17	17	17	17	17
	Influent Vapor Temp.	°F	58	58	58	60	59
	Groundwater Temp.	°F	-	-	-	-	-
	Air Temp	°F	40	40	40	42	42
	Barometric Pressure	In Hg	30.14	30.15	30.16	30.15	30.17
	Absolute Pressure	In Hg	26.06	26.06	26.08	26.09	26.11
VAPOR / INFLUENT	TPH	ppmv	4650	-	5046	-	4720
	CO <sub>2</sub>	%	9.20	-	10.22	-	9.75
	O <sub>2</sub>	%	6.3	-	5.4	-	6.2
	H <sub>2</sub> S	ppm	-	-	-	-	-
EVR	EVR Pressure	psi					
	EVR Flow	cfh					
NOTES	arrived on site at 7:45		Final				
	Tail gate safety check		DTP - 67.65				
	Started work at 8:00 am		DTW - 67.87				
RECOVERY	Totalizer	gals					
	Pump Rate	gals/min					
	Total Volume	gals					
	NAPL	% Vol					
	NAPL	Gals					
EW	Data Logger Head	ft					
	GW Depression	ft					
	Extraction Well	DTNAPL					
	Extraction Well	DTGW					



OPERATING DATA - EVENT # *11E*

PAGE # *2*

ACUVAC MDPE SYSTEM

Location: Vacuum Glorietta Site, Lea County, NM			Project Managers: Vasquez / George			
Well # <i>VG-4</i>	Date	<i>11/11/22</i>				
	Time	<i>1100</i>	<i>1130</i>	<i>1200</i>		
	Hr Meter					
ENGINE / BLOWER	Engine Speed	RPM	<i>1800</i>	<i>1800</i>	<i>1800</i>	
	Oil Pressure	psi	<i>55</i>	<i>55</i>	<i>55</i>	
	Water Temp	°F	<i>130</i>	<i>130</i>	<i>130</i>	
	Alternator	Volts	<i>14</i>	<i>14</i>	<i>14</i>	
	Intake Vacuum	"Hg	<i>19</i>	<i>19</i>	<i>19</i>	
	Gas Flow Fuel/Propane	cfh	<i>120</i>	<i>120</i>	<i>120</i>	
ATMOSPHERE VACUUM / AIR	Extraction Well Vac.	In H <sub>2</sub> O	<i>54</i>	<i>54</i>	<i>54</i>	
	Extraction Well Flow	scfm	<i>17.61</i>	<i>14.58</i>	<i>14.58</i>	
	Well Flow Ref Number		<i>17</i>	<i>17</i>	<i>17</i>	
	Influent Vapor Temp.	°F	<i>60</i>	<i>62</i>	<i>62</i>	
	Groundwater Temp.	°F	<i>-</i>	<i>-</i>	<i>-</i>	
	Air Temp	°F	<i>43</i>	<i>45</i>	<i>46</i>	
	Barometric Pressure	In Hg	<i>30.16</i>	<i>30.14</i>	<i>30.13</i>	
	Absolute Pressure	In Hg	<i>26.11</i>	<i>26.11</i>	<i>26.09</i>	
VAPOR / INFLUENT	TPH	ppmv	<i>5140</i>	<i>-</i>	<i>6090</i>	
	CO <sub>2</sub>	%	<i>9.88</i>	<i>-</i>	<i>11.52</i>	
	O <sub>2</sub>	%	<i>6.0</i>	<i>-</i>	<i>3.5</i>	
	H <sub>2</sub> S	ppm	<i>-</i>	<i>-</i>	<i>-</i>	
EVR	EVR Pressure	psi				
	EVR Flow	cfh				
NOTES						
RECOVERY	Totalizer	gals				
	Pump Rate	gals/min				
	Total Volume	gals				
	NAPL	% Vol				
	NAPL	Gals				
EW	Data Logger Head	ft				
	GW Depression	ft				
	Extraction Well	DTNAPL				
	Extraction Well	DTGW				

**District I**  
 1625 N. French Dr., Hobbs, NM 88240  
 Phone:(575) 393-6161 Fax:(575) 393-0720  
**District II**  
 811 S. First St., Artesia, NM 88210  
 Phone:(575) 748-1283 Fax:(575) 748-9720  
**District III**  
 1000 Rio Brazos Rd., Aztec, NM 87410  
 Phone:(505) 334-6178 Fax:(505) 334-6170  
**District IV**  
 1220 S. St Francis Dr., Santa Fe, NM 87505  
 Phone:(505) 476-3470 Fax:(505) 476-3462

**State of New Mexico**  
**Energy, Minerals and Natural Resources**  
**Oil Conservation Division**  
**1220 S. St Francis Dr.**  
**Santa Fe, NM 87505**

CONDITIONS

Action 190494

**CONDITIONS**

Operator: Maverick Permian LLC 1000 Main Street, Suite 2900 Houston, TX 77002	OGRID: 331199
	Action Number: 190494
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

**CONDITIONS**

Created By	Condition	Condition Date
michael.buchanan	Review of the Vacuum Glorietta East Unit, 2022 Annual Report: Content Satisfactory 1. Continue to operate SVE system and conduct O&M routinely as system is functioning appropriately and is effective. 2. Complete evaluation for PSH and its presence in VG-4 3. Continue to conduct semi-annual groundwater monitoring events and submit them to OCD. 4. Submit the 2023 Annual Report if it hasn't already been uploaded to the online portal. 5. Submit the 2024 Annual Report to OCD by April 1, 2025.	6/6/2024